

Scandinavian Airlines System

PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
CHAPTER 12 TAB			12-11-01		CONT.	12-13-01		CONT.
SERVICING			335	DEC 22/04	03	305	AUG 22/02	01C
EFFECTIVE PAGES			336	DEC 22/04	03	306	AUG 22/02	01C
SEE LAST PAGE OF LIST			337	DEC 22/04	04	307	AUG 22/02	01C
FOR NUMBER OF PAGES			338	APR 22/06	09	308	FEB 10/95	01C
12-CONTENTS			339	AUG 22/04	08	12-13-02		
1	AUG 22/04	SAS	340	AUG 22/04	07	301	APR 22/04	01C
R 2	AUG 22/09	SAS.1	341	AUG 22/07	04	302	AUG 22/00	01C
3	APR 22/05	SAS	342	AUG 22/04	07	303	AUG 22/00	01C
4	AUG 22/07	SAS	343	AUG 22/04	06	304	AUG 22/00	01C
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12-00-00			302	MAY 10/90	01	302	NOV 10/96	01
1	AUG 22/04	02	303	AUG 22/07	02	303	AUG 10/93	03
2	AUG 10/94	01	304	AUG 22/07	02	304	DEC 22/01	07
3	AUG 10/94	02	305	APR 22/08	01	305	AUG 10/96	04
4	BLANK		306	DEC 22/03	06	306	APR 22/08	03
12-11-01			307	DEC 22/03	01	307	APR 22/00	03
301	AUG 22/99	01	308	BLANK		308	DEC 22/07	02
302	DEC 22/01	06	12-11-03			309	AUG 22/05	02
303	AUG 22/04	01	301	APR 22/08	01	310	AUG 22/05	01
304	AUG 22/04	01	302	AUG 22/00	09	311	DEC 22/00	01
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306	AUG 22/07	02	304	AUG 22/00	07	313	APR 22/02	01
307	AUG 22/07	02	305	APR 22/08	03	314	APR 10/98	03
R 308	AUG 22/09	03.1	306	APR 22/08	08	12-13-04		
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310	AUG 22/06	02	308	APR 22/08	08	302	DEC 22/07	01
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317	AUG 22/06	02	306	DEC 22/00	01	309	DEC 22/07	06
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333	DEC 22/04	02	302	AUG 22/00	01C	302	AUG 22/04	01
334	AUG 22/04	06	303	AUG 22/00	02C	303	DEC 22/00	01
			304	AUG 22/02	01C	304	AUG 22/01	01

R = REVISED, A = ADDED OR D = DELETED

F = FOLDOUT PAGE

33

AUG 22/09

D633T133

CHAPTER 12

EFFECTIVE PAGES

PAGE 1

CONTINUED

Scandinavian Airlines System

PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
12-14-01	CONFIG 1		12-15-03			12-15-11		
301	DEC 22/06	01	301	DEC 22/06	04	301	APR 22/05	01
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305	DEC 22/02	01	316	DEC 22/02	03	12-16-03		
306	DEC 22/06	01	317	AUG 22/05	04	301	APR 22/08	02
307	DEC 22/06	01	318	APR 22/08	03	302	AUG 10/96	02
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			12-15-08			306	APR 22/03	01
12-15-02			301	APR 22/07	03			
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			304	DEC 22/03	02	308	AUG 22/08	02

R = REVISED, A = ADDED OR D = DELETED

F = FOLDOUT PAGE

33

AUG 22/09

D633T133

CHAPTER 12

EFFECTIVE PAGES

PAGE 2

CONTINUED

Scandinavian Airlines System

PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
12-21-05		CONT.	12-21-09		CONT.	12-21-13		
309	AUG 22/08	02	307	DEC 22/07	01	301	AUG 22/07	01
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303	DEC 22/08	02	312	AUG 22/03	01	306	AUG 22/03	01
304	DEC 22/08	02	313	AUG 22/03	01	12-21-14		
305	DEC 22/08	02	314	AUG 22/03	01	301	DEC 22/08	23
306	DEC 22/08	02	315	AUG 22/03	01	302	AUG 22/08	01
R 307	AUG 22/09	01.1	316	DEC 22/05	01	303	AUG 22/06	13
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12-21-07			318	DEC 22/07	01	305	APR 22/06	08
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315	DEC 22/05	03	304	AUG 22/03	01	12-21-15		
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317	DEC 22/05	02	306	APR 22/08	02	302	APR 22/05	01
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12-21-09			307	AUG 22/03	01	301	AUG 22/07	05
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R = REVISED, A = ADDED OR D = DELETED

F = FOLDOUT PAGE

33

AUG 22/09

D633T133

CHAPTER 12

EFFECTIVE PAGES

PAGE 3

CONTINUED

Scandinavian Airlines System

PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
12-21-17			12-21-25			12-22-02		
301	AUG 22/06	13	301	DEC 22/06	02	301	APR 22/04	01C
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12-21-18			305	AUG 22/03	01	303	APR 22/08	02
R 301	AUG 22/09	03.1	306	AUG 22/05	01	304	DEC 10/98	02
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12-21-19			12-21-30			304	APR 22/06	02
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12-21-20			301	APR 22/06	02	311	APR 22/06	08
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12-21-22			12-21-32			314	APR 22/06	02
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R = REVISED, A = ADDED OR D = DELETED
 F = FOLDOUT PAGE
 33
 AUG 22/09

D633T133

CHAPTER 12
 EFFECTIVE PAGES
 PAGE 4
 CONTINUED

Scandinavian Airlines System

PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
12-25-04			12-33-02		CONT.			
201	APR 22/07	01	325	APR 22/04	01A			
202	APR 22/07	01	326	APR 22/07	02A			
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12-30-00			328	AUG 22/07	02A			
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12-33-02								
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322	APR 22/04	01A						
323	APR 22/00	01A						
324	AUG 22/05	01A						

R = REVISED, A = ADDED OR D = DELETED

F = FOLDOUT PAGE

33

AUG 22/09

D633T133

CHAPTER 12

EFFECTIVE PAGES

PAGE 5

LAST PAGE



BOEING
767
MAINTENANCE MANUAL

CHAPTER 12 - SERVICING

TABLE OF CONTENTS

<u>Subject</u>	<u>Chapter Section Subject</u>	<u>Page</u>	<u>Effectivity</u>
<u>SERVICING</u>	12-00-00		
Description and Operation		1	ALL
General		1	
Airplane Servicing		1	
<u>REPLENISHING</u>	12-10-00		
FUEL SERVICING	12-11-00		
DRAINING - FUEL SUMP	12-11-03		
Servicing		301	ALL
FUELING - FUEL TANK OVERWING	12-11-02		
Servicing		301	ALL
FUELING - FUEL TANK PRESSURE	12-11-01		
Servicing		301	ALL
Precautions and Limits for the Refuel Operation		304	
Prepare for Pressure Refuel		316	
HYDRAULIC SERVICING	12-12-00		
SNUBBER - NOSE RADOME	12-12-03		
Servicing		301	ALL
SYSTEMS - HYDRAULIC	12-12-01		
Servicing		301	ALL
OIL SERVICING	12-13-00		
ACTUATOR - STAB TRIM BALLSCREW	12-13-06		
Servicing		301	ALL
APU	12-13-04		
Servicing		301	ALL
ENGINE	12-13-01		
Servicing		301	ALL
GENERATOR - INTEGRATED DRIVE	12-13-03		
Servicing		301	ALL
PUMP - AIR DRIVEN	12-13-05		
Servicing		301	ALL
STARTER - ENGINE	12-13-02		
Servicing		301	ALL
TRAILING EDGE FLAP DRIVE SYSTEM	12-13-08		
Servicing		301	[*]
[*] AIRPLANES WITH OIL-FILLED SERVICEABLE ALTERNATE MOTORS			
WATER SERVICING	12-14-00		

CHAPTER 12 - SERVICING

TABLE OF CONTENTS

<u>Subject</u>	<u>Chapter Section Subject</u>	<u>Page</u>	<u>Effectivity</u>
SYSTEM - POTABLE WATER	12-14-01		
Servicing		301	CONFIG 1 [*]
[*] AIRPLANES WITH AFT FILL SERVICE PANEL WITH TWO PORTS (SEPARATE FILL AND DRAIN)			
Servicing		301	CONFIG 2 [*]
[*] CONFIGURATION NOT USED			
Servicing		301	CONFIG 3 [*]
[*] AIRPLANES WITH AFT FILL SERVICE PANEL WITH ONE PORT (COMBINED FILL/DRAIN)			
GASEOUS SERVICING	12-15-00		
ACCUMULATOR - BRAKE HYDRAULIC SYSTEM SURGE	12-15-09		
Servicing		301	ALL
ACCUMULATOR - PARKING BRAKE	12-15-04		
Servicing		301	ALL
ACTUATOR - TAIL SKID SHOCK STRUT	12-15-05		
Servicing		301	ALL
FLUIDS - LANDING GEAR SHOCK STRUT	12-15-11		
Servicing		301	ALL
OXYGEN	12-15-08		
Servicing		301	ALL
STRUT - MAIN GEAR SHOCK	12-15-01		
Servicing		301	ALL
STRUT - NOSE GEAR SHOCK	12-15-02		
Servicing		301	ALL
TIRES - LANDING GEAR	12-15-03		
Servicing		301	ALL
WINDOW SERVICING	12-16-00		
BOTTLE - RAIN REPELLENT	12-16-01		
Servicing		301	[*]
[*] AIRPLANES WITH RAIN REPELLENT SYSTEM			
WINDOWS - FLIGHT COMPARTMENT	12-16-02		
Servicing		301	ALL
WINDOWS - PASSENGER	12-16-03		
Servicing		301	ALL
LAVATORY SERVICING	12-17-00		
TANK - WASTE	12-17-01		
Servicing		301	ALL

CHAPTER 12 - SERVICING

TABLE OF CONTENTS

<u>Subject</u>	<u>Chapter Section Subject</u>	<u>Page</u>	<u>Effectivity</u>
<u>SCHEDULED SERVICING</u>	12-20-00		
AIRPLANE LUBRICATION	12-21-00		
Servicing		301	ALL
AILERON AND AILERON TRIM	12-21-07		
Servicing		301	ALL
BEAM - MAIN LANDING GEAR SUPPORT	12-21-11		
Servicing		301	ALL
BEARING - AFT WHEEL WELL	12-21-17		
BULKHEAD AND SUPPORT FITTING			
SPHERICAL			
Servicing		301	ALL
CABLES - CONTROL	12-21-31		
Servicing		301	ALL
CONTROL - SPOILER/SPEEDBRAKE	12-21-10		
Servicing		301	ALL
DOOR - BULK CARGO	12-21-24		
Servicing		301	ALL
DOOR - ENTRY/SERVICE	12-21-18		
Servicing		301	ALL
DOOR - FORWARD AND AFT CARGO	12-21-22		
Servicing		301	ALL
DOORS - EQUIPMENT COMPARTMENT	12-21-27		
AND EXTERIOR SERVICE			
Servicing		301	ALL
ELEVATOR CONTROL SYSTEM	12-21-04		
Servicing		301	ALL
HATCH - OVERWING ESCAPE	12-21-20		
Servicing		301	ALL
HORIZONTAL STABILIZER TRIM	12-21-05		
CONTROL SYSTEM			
Servicing		301	ALL
LEADING EDGE SLAT SYSTEM	12-21-08		
Servicing		301	ALL
LEVERS - THRUST	12-21-25		
Servicing		301	[*]
[*] AIRPLANES WITH TITANIUM THRUST LEVER ASSEMBLY P/N 254N1131			
MECHANISMS - MAIN GEAR AND	12-21-14		
ACTUATING			
Servicing		301	ALL

CHAPTER 12 - SERVICING

TABLE OF CONTENTS

<u>Subject</u>	<u>Chapter Section Subject</u>	<u>Page</u>	<u>Effectivity</u>
MECHANISMS - MAIN GEAR DOORS AND ACTUATING	12-21-15		
Servicing		301	ALL
MECHANISMS - NOSE GEAR AND ACTUATING	12-21-12		
Servicing		301	ALL
MECHANISMS - NOSE GEAR DOORS AND OPERATING	12-21-13		
Servicing		301	ALL
MECHANISMS - TAIL SKID ACTUATING	12-21-16		
Servicing		301	ALL
RUDDER AND RUDDER TRIM CONTROL SYSTEM	12-21-06		
Servicing		301	ALL
STRUT	12-21-32		
Servicing		301	ALL
SYSTEM - CONTAINERIZED CARGO HANDLING	12-21-33		
Servicing		301	ALL
SYSTEM - OFF-WING ESCAPE	12-21-19		
Servicing		301	ALL
SYSTEM - TRAILING EDGE FLAP	12-21-09		
Servicing		301	ALL
TURBINE - RAM AIR	12-21-30		
Servicing		301	ALL
WINDOW - NO. 2	12-21-34		
Servicing		301	ALL
ENGINE	12-22-00		
ENGINE	12-22-01		
Servicing		301	ALL
PUMP - AIR DRIVEN	12-22-04		
Servicing		301	ALL
STARTER - ENGINE	12-22-02		
Servicing		301	ALL
MISCELLANEOUS SERVICING	12-23-00		
Servicing		301	ALL
Filter Identification		301	
CLEANING AND POLISHING	12-25-00		
BIRD STRIKE CLEANING	12-25-04		
Maintenance Practices		201	ALL
CLEANING AND POLISHING	12-25-01		
Servicing		301	ALL



BOEING
767
MAINTENANCE MANUAL

CHAPTER 12 – SERVICING

TABLE OF CONTENTS

<u>Subject</u>	<u>Chapter Section Subject</u>	<u>Page</u>	<u>Effectivity</u>
<u>ACCESS DOORS AND PANELS</u>	12-30-00		
Maintenance Practices		201	ALL
COLD WEATHER MAINTENANCE	12-33-00		
COLD WEATHER MAINTENANCE	12-33-01		
Servicing		301	ALL
EXTREME COLD WEATHER MAINTENANCE	12-33-02		
Servicing		301	ALL

SERVICING - DESCRIPTION AND OPERATION

1. General

- A. Refer to these airplane maintenance manuals for the location and identification of doors and exterior panels:
- | | |
|--|------------------|
| (1) Fuselage (Major Zones 100 and 200) Access Doors and Panels | AMM 06-41-00/201 |
| (2) Empennage (Major Zone 300) Access Doors and Panels | AMM 06-42-00/201 |
| (3) Engine and Nacelle Strut (Major Zone 400) Access Doors and Panels | AMM 06-43-00/201 |
| (4) Wings (Major Zones 500 and 600) Access Doors and Panels | AMM 06-44-00/201 |
| (5) Landing Gear and Gear Doors (Major Zone 700) Access Doors and Panels | AMM 06-45-00/201 |
| (6) Entry, Service, and Cargo Doors (Major Zone 800) Access Doors and Panels | AMM 06-46-00/201 |
- B. Refer to these airplane maintenance manuals for the servicing of fuel, hydraulic fluid, oil, water, and gaseous systems:
- | | |
|---|------------------|
| (1) Fuel Servicing | AMM 12-11-01/301 |
| (2) Hydraulic Servicing | AMM 12-12-01/301 |
| (3) Oil Servicing | AMM 12-13-01/301 |
| (4) Water Servicing | AMM 12-14-01/301 |
| (5) Main gear shock strut servicing | AMM 12-15-01/301 |
| (6) Nose gear shock strut servicing | AMM 12-15-02/301 |
| (7) Landing gear tires | AMM 12-15-03/301 |
| (8) Parking brake accumulator servicing | AMM 12-15-04/301 |
| (9) Oxygen servicing | AMM 12-15-08/301 |
| (10) Brake hydraulic system surge accumulator servicing | AMM 12-15-09/301 |
- C. Refer to these airplane maintenance manuals for scheduled servicing:
- | | |
|---|------------------|
| (1) Engine starter servicing (Oil Change) | AMM 12-22-02/301 |
| (2) Airplane Servicing (Filter Identification) | AMM 12-23-00/301 |
| (3) Airplane Servicing (Cleaning and Polishing) | AMM 12-25-01/301 |
- D. Refer to these airplane maintenance manuals for servicing of the airplane for cold weather operation:
- | | |
|--------------------------------------|--------------|
| (1) Cold Weather Maintenance | 12-33-01/301 |
| (2) Extreme Cold Weather Maintenance | 12-33-02/301 |
- E. Safety harness receptacles are provided on the wing and horizontal stabilizer upper surfaces for use by maintenance personnel working high above the ground (AMM 20-10-27/201).

2. Airplane Servicing (Fig. 1)

- A. Conditioned air is provided through a receptacle downstream of the air conditioning packs.
- B. External electrical power, 115VAC and 90KVA, can be connected in the nose gear wheel well area.
- C. Pressure fueling is accomplished through two underwing receptacles in the left wing outboard section. The airplane may also be fueled through two overwing fill ports.
- D. Pneumatic air for engine start and air conditioning is supplied by a ground cart connected to the lower fuselage, forward of wheel well.

EFFECTIVITY

ALL

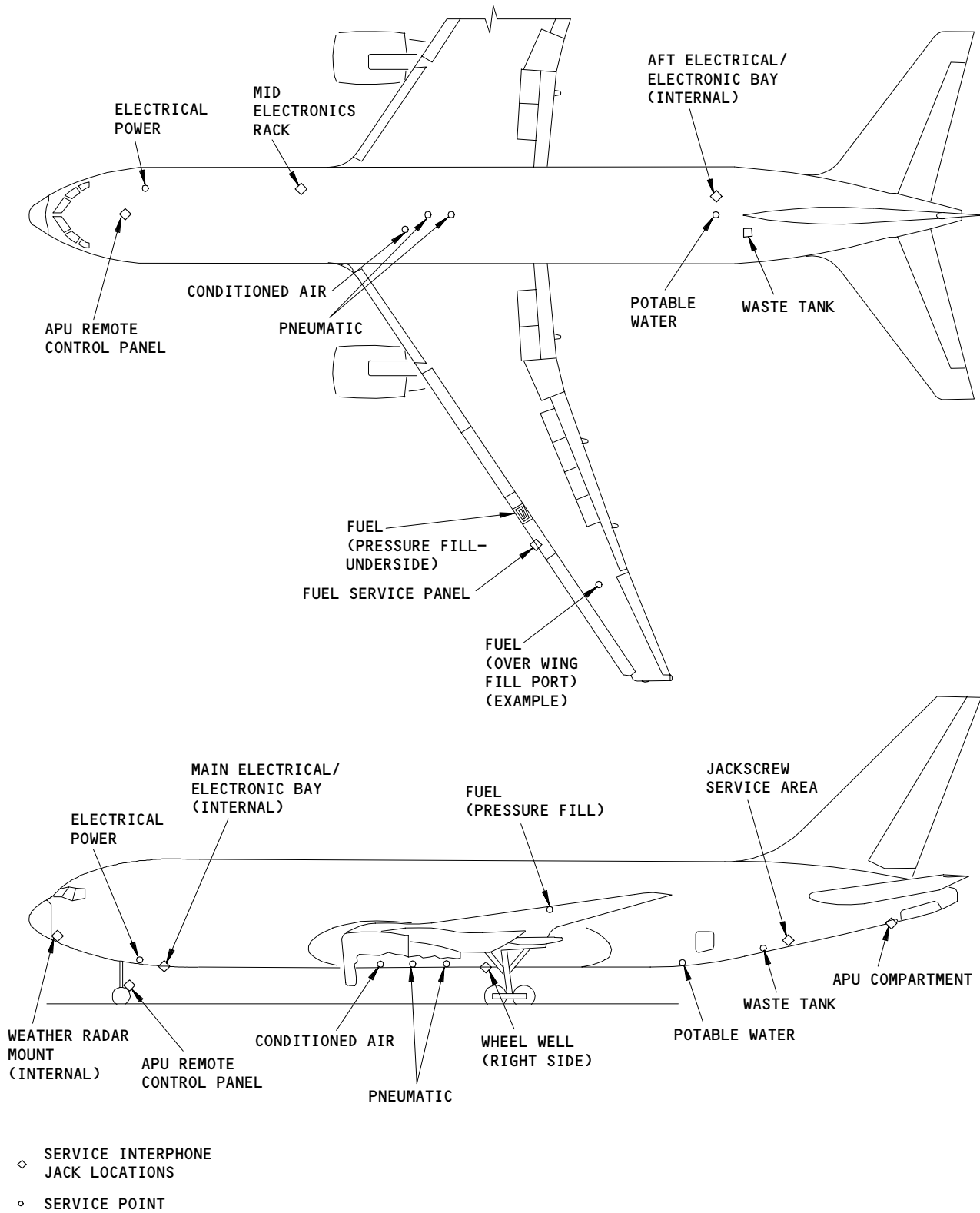
12-00-00

02

Page 1
Aug 22/04

BOEING

767 MAINTENANCE MANUAL



Service Connection Locations
Figure 1

EFFECTIVITY	
ALL	

12-00-00

01

Page 2
Aug 10/94

 **BOEING**
767
MAINTENANCE MANUAL

- E. Waste tank servicing is from a single service point on lower aft fuselage.
- F. Potable water is supplied from a 120 gallon pressurized tank. The tank is serviced through a single connection on the lower fuselage forward of bulk cargo door.
- G. There are nine service interphone jacks at key service locations.

EFFECTIVITY

ALL

12-00-00

02

Page 3
Aug 10/94

FUEL TANK PRESSURE FUELING – SERVICING

1. General (Fig. 301)

- A. The pressure fueling method is usually used to refuel the airplane. During pressure fueling, the fuel quantity indicating system (FQIS) (AMM 28-41-00/001) operates with the pressure fueling system. The FQIS processor controls the automatic fueling operation. The fueling crew can operate the fueling control switches at the fueling control panel to stop the FQIS processor during the fueling operation. If you can not refuel the airplane by the automatic operation, you can refuel the airplane by the manual operation. You can also use the overwing fill ports to refuel the airplane (AMM 12-11-02/301).
- B. When thunderstorms or lightning are within a 10 mile (16 kilometer) radius of the immediate area, the refueling procedure should stop.
- C. Strong wind conditions can cause a build-up of static electricity. Large charges of static electricity can develop on support equipment while parked as a result of the movement of dust particles and air currents during strong wind conditions. Strong wind conditions can also cause the unwanted movement of items or equipment which can hit the airplane or injure persons. Wind gusts can damage the airplane structure. Fueling procedures should stop if strong wind conditions are present.
- D. The fueling station is found in the left wing leading edge, between slats 3 and 4. The fueling station contains the pressure fueling adapters, grounding points, a fueling panel light, an interphone jack, and a fueling control panel. Aluminum foil markers installed on the fueling station door give the fueling procedures, and the applicable cautions.
- E. It is necessary to have 28v dc of electrical power to refuel the airplane.

NOTE: You can get electrical power from the ground handling bus or the hot battery bus.

- F. If you cannot get electrical power, you can operate the fueling shutoff valves manually (AMM 28-21-00/001). While there is no electrical power, you can measure the fuel quantity if you use the fuel measuring sticks. The fuel measuring sticks are found in the lower wing surface (AMM 28-44-00/001).

EFFECTIVITY

ALL

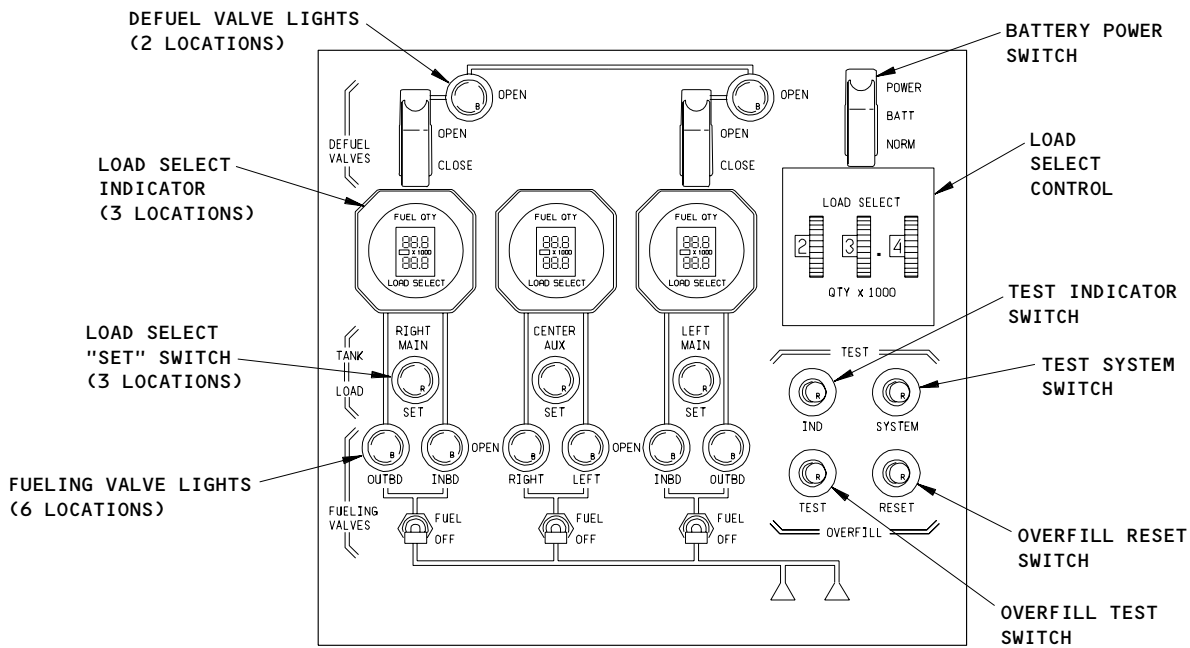
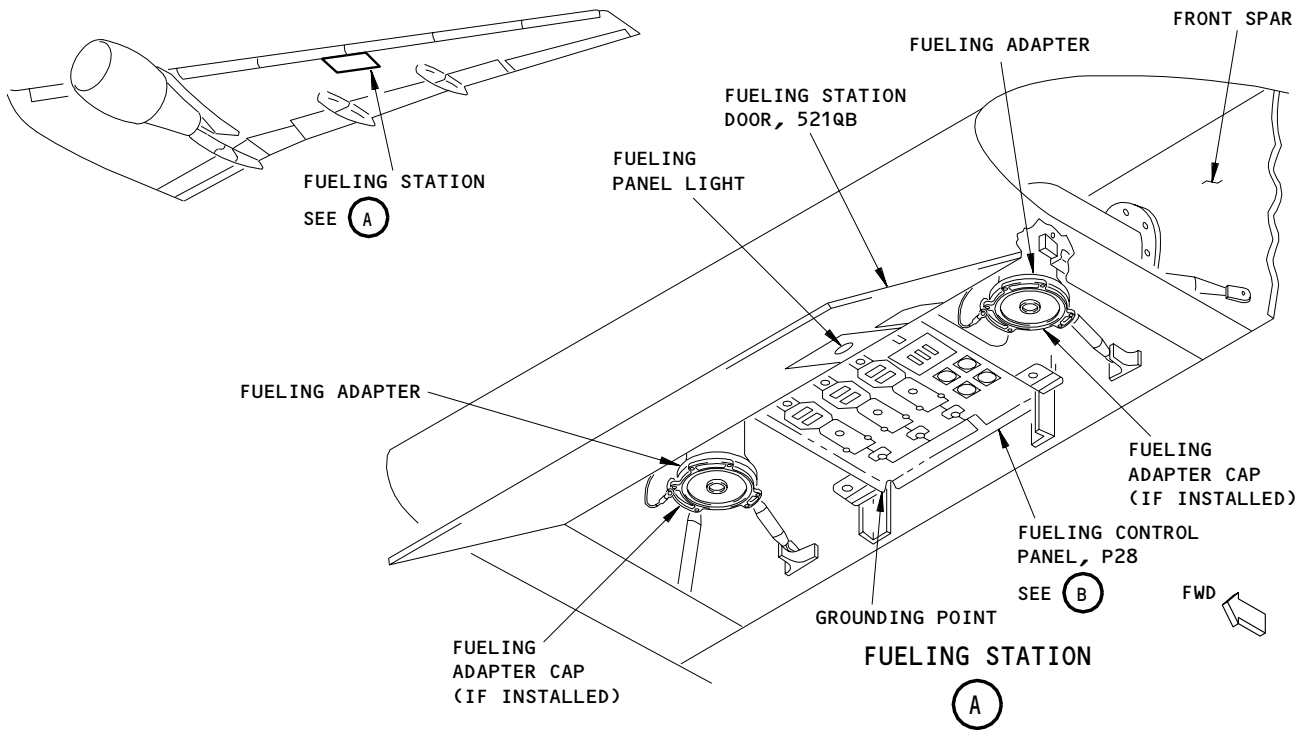
12-11-01

01

Page 301
Aug 22/99

BOEING

767 MAINTENANCE MANUAL



FUELING CONTROL PANEL, P28

(B)

Pressure Fueling
Figure 301

EFFECTIVITY	
	ALL

12-11-01

- G. The fueling manifold holds 270 lbs (120 kgs) of fuel. After pressure fueling, the fuel caught in the fueling manifold drains into the auxiliary fuel tank. This quantity of fuel can show on the FQIS indicators after fueling.
- H. Drain the fuel tank sumps before fueling to keep water out of the fuel tank (AMM 12-11-03/301).
- (1) If there are intermittent fuel quantity errors of more than 5% and the FQIS processor shows a compensator is bad, there can be water in the compensator.
 - (2) Fueling at pressures between 35 and 55 psig helps keep water away from the compensator.
 - (3) Unwanted materials can block the automatic sumping pumps and prevent the scavenge of water. Remove the automatic sumping pumps and examine the motive orifice and induced port for contamination (AMM 28-22-06/401).
- I. There is a fuel overflow system to stop fuel overflow leakage (AMM 28-21-00/001). If the fuel overflow system does not operate correctly and there is fuel leakage, stop the pressure fueling immediately to keep the fire hazard to a minimum.
- J. Fuel loading limits:
- (1) Fuel must agree with jet fuel specification ASTM D1655.
 - (2) Refuel the main fuel tanks with approximately equal quantities of fuel.
 - (3) Do not put fuel in the center tank if it is not necessary. You can put 22,050 lbs (10,000 kgs) of fuel in the center tank with less than full main tanks. The weight of the fuel in the center tank plus the Zero Fuel Weight must not be more than the Maximum Zero Fuel Weight.
 - (4) If you obey steps 1, 2, and 3 you can fill the fuel tanks in any sequence or at the same time.
- NOTE:** A full wing fuel load imbalance is acceptable during ground maintenance.
- K. This procedure gives instructions for automatic pressure fueling, manual pressure fueling, and pressure fueling without electrical power.

EFFECTIVITY

ALL

12-11-01

01

Page 303
Aug 22/04

TASK 12-11-01-653-270

2. Precautions and Limits for the Refuel Operation

A. General

- (1) Obey all of the procedures, requirements and precautions in this task when you refuel the airplane.
 - (a) Fuel servicing regulation requirements
 - (b) Fuel requirements
 - (c) Emergency procedures
 - (d) Fuel spill procedure
 - (e) Passenger precautions
 - (f) Airplane system precautions
 - (g) Refueling precautions
 - (h) Airplane separation from equipment distance limits
 - (i) Electrical/electronic systems separation distance limits
 - (j) Fuel servicing equipment precautions
 - (k) Ground equipment and airplane servicing equipment precautions
 - (l) Personnel precautions
 - (m) Fueling zone
 - (n) Adverse weather conditions precautions

B. Access

(1) Location Zones

- | | |
|-----|--|
| 133 | Wing Center Section (Left) |
| 134 | Wing Center Section (Right) |
| 531 | Center Auxiliary Tank (Left) |
| 532 | Main Tank - Inboard of Rib No. 10 (Left) |
| 541 | Main Tank - Outboard of Rib No. 10 (Left) |
| 631 | Center Auxiliary Tank (Right) |
| 632 | Main Tank - Inboard of Rib No. 10 (Right) |
| 641 | Main Tank - Outboard of Rib No. 10 (Right) |

C. Fuel Servicing Regulation Requirements

§ 913-271

- (1) Each operator is responsible for complying with the local, state and national regulations regarding airplane fuel servicing. It is possible that fire codes and standards make it necessary to use different or more restrictive procedures than those given below. Make sure the procedures used during the refuel operation give sufficient protection to persons and equipment.

§ 913-272

- (2) If you make a decision not to do this recommended procedure, you must have an approved alternative procedure.

D. Fuel Requirements

EFFECTIVITY

ALL

12-11-01

01

Page 304
Aug 22/04

S 653-412

WARNING: OBEY THE FUEL GRADE LIMITATION. IF YOU USE THE INCORRECT GRADE OF FUEL, ENGINE FLAMEOUT, PERFORMANCE DEGRADATION, OR DAMAGE CAN OCCUR.

- (1) Make sure the fuel source contains the correct fuel grade as specified by the AFM (Airplane Flight Manual).

S 653-414

WARNING: DO NOT USE WIDE CUT FUEL WHEN IT IS NOT PERMITTED. A FLAMEOUT CAN OCCUR AND THE ENGINE POWER CAN DECREASE SUDDENLY.

WARNING: DO NOT USE JET B/JP-4 FUEL WITH GENERAL ELECTRIC MODEL CF6-80C2 ENGINES WITH DRIBBLE FUEL NOZZLES (P/N'S 9331M72P33/P34/P41 AND 1968M49P07/P08). LOOK AT THE FUEL PANEL MARKER FOR FUEL TYPE RESTRICTIONS.

DO NOT USE JET B/JP-4 FUEL WHEN OVERRIDE/JETTISON PUMPS, PN S343T002-23 AND SUBSEQUENT DASH NUMBERS, ARE INSTALLED. LOOK AT THE FUEL PANEL MARKER FOR FUEL TYPE RESTRICTIONS.

- (2) Do not use wide-cut fuel when it is not permitted.

E. Emergency Procedures

S 653-276

- (1) Obey all airport and operator provided fire protection, rescue and fuel spill emergency procedures. Emergency procedures include these subjects:
 - (a) Location of emergency fuel shutoff
 - (b) Airport fire department phone numbers
 - (c) Evacuation of airplane passengers
 - (d) Fuel spill containment and ignition source reduction
 - (e) Location and use of fire extinguishers
 - (f) Responsibilities of fuel servicing and airplane servicing personnel.

S 653-277

- (2) Refuel the airplane in areas which allow the free movement of air, fire fighting equipment and other emergency equipment.

S 653-278

- (3) Stop the refuel operation if any conditions change which could cause an unsafe condition for persons or equipment.

EFFECTIVITY

ALL

12-11-01

02

Page 305
Aug 22/07

F. Fuel Spill Procedure

S 653-279

- (1) Each fuel spill event is different. Variables such as the size of the spill, weather conditions, equipment location, airplane occupancy, emergency equipment and personnel available will determine the correct response to control the fire hazard.

S 653-280

- (2) During a refuel operation, continuously monitor the airplane for fuel leaks and spills.

WARNING: DO THESE STEPS IF A FUEL SPILLAGE OCCURS DURING REFUELING.
INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

S 653-281

- (3) If a fuel spill occurs, do these steps:
 - (a) Stop the refueling operation.
 - (b) Notify persons on board the airplane.
 - (c) Unload the APU and shut it down. To do this, do this task:
APU Usual Shutdown (AMM 49-11-00/201).
 - 1) Do not start the APU until the spilled fuel is removed and there is no further risk of spilled fuel or vapors.
 - (d) Find and correct the cause of the fuel spill.
 - (e) Inspect enclosed areas to make sure they are free of fuel vapor.
 - (f) Do not begin the refuel operation again until the fire department or the person(s) with the authority to make safety decisions have given approval.

G. Passenger Precautions

S 653-282

WARNING: OBEY THE PASSENGER PRECAUTIONS DURING A REFUEL OPERATION. IF YOU DO NOT OBEY THESE REQUIREMENTS INJURY TO PERSONS CAN OCCUR.

- (1) Obey all airport and operator procedures if you refuel the airplane with passengers onboard.

S 653-283

- (2) A hazardous area must be identified for passengers that board or unload during a refuel operation. Barriers must be in place to stop passengers from entering this hazardous area (Fig. 301).

H. Airplane System Precautions

EFFECTIVITY

ALL

12-11-01

02

Page 306
Aug 22/07

S 653-284

WARNING: OBEY THE AIRPLANE SYSTEM PRECAUTIONS DURING A REFUEL OPERATION. IF YOU DO NOT OBEY THESE REQUIREMENTS A FIRE OR AN EXPLOSION CAN OCCUR.

- (1) Do not operate this airplane system during a refuel operation:

WARNING: DO NOT OPERATE THE HF RADIO SYSTEM WHILE YOU PUT THE FUEL IN THE AIRPLANE. AN EXPLOSION CAN OCCUR.

- (a) Do not operate the HF radio communication system.

S 653-285

- (2) Do not do these maintenance tasks during a refuel operation:

- (a) Connect or disconnect the battery chargers, airplane ground-power generators or other electrical ground-power.
(b) Fill or change oxygen bottles.
(c) Remove electrical power.

NOTE: Damage to refuel system components can occur.

- (d) Begin the refuel operation if a fire warning light or engine overheat warning light is displayed in the flight compartment.
(e) Begin the refuel operation if any part of the landing gear is unusually hot.

S 653-286

- (3) Make sure the wing pressure relief valves (two locations) at the wing surge tanks are closed.

S 653-287

- (4) Damage or wear at the refuel receptacle adapter can cause fuel leaks. Do these maintenance actions to prevent fuel leaks:
(a) Make sure the mating surface of the fuel hose and refuel receptacle adapter are clean and free from unwanted material.
(b) Make sure the slots and lugs on the adapter are not damaged.
(c) Make sure the defuel lever is correctly positioned.

S 653-288

- (5) Make sure the landing gear wheel chocks do not touch the tires. The wheel chocks can wedge against the tire after you add fuel.

S 653-289

- (6) A refuel operation with a main engine operating is an emergency procedure. Obey all airport and operator provided emergency procedures.

EFFECTIVITY

ALL

12-11-01

02

Page 307
Aug 22/07

I. Refueling Precautions

S 653-290

CAUTION: MAKE SURE YOU PUT THE SAME QUANTITY OF FUEL INTO THE RIGHT MAIN TANK AND THE LEFT MAIN TANK. THE AIRPLANE WILL NOT FLY CORRECTLY AND DAMAGE TO THE WINGS CAN OCCUR.

- (1) Refuel the main fuel tanks with approximately equal quantities of fuel.

S 653-378

- (2) Do not put fuel in the auxiliary tank if it is not necessary. You can put up to 22,050 lbs (10,000 kgs) of fuel in the auxiliary tank if the main tanks are not full.

(a) AIRPLANES WITH JETTISON SYSTEM;

Make sure these conditions are met:

- 1) A minimum of 10,300 pounds (4,672 kgs) of fuel are in the wing tanks.
- 2) The weight of the fuel in the auxiliary tank plus actual Zero Fuel Weight does not exceed Maximum Zero Fuel Weight.
- 3) Balance limits are followed.

S 653-379

- (3) If you obey the steps above, you can fill the fuel tanks in any sequence or at the same time.

NOTE: A full wing fuel load imbalance is acceptable during ground maintenance.

S 653-296

CAUTION: DO NOT USE MORE THAN 55 PSI FUEL PRESSURE AT THE FUELING NOZZLE. IF YOU USE MORE THAN 55 PSI FUEL PRESSURE, YOU CAN CAUSE DAMAGE TO THE FUELING SYSTEM COMPONENTS.

- (4) Make sure the fueling source does not pressurize the fueling system to more than 55 psi.

NOTE: This pressure corresponds to a maximum fueling rate of 500 gallons per minute if you fuel all three tanks simultaneously.

EFFECTIVITY

ALL

12-11-01

03.1

Page 308
Aug 22/09

S 943-297

CAUTION: MAKE SURE THERE IS NO EQUIPMENT BELOW THE WINGTIP DURING THE REFUEL OPERATION. DAMAGE TO THE EQUIPMENT OR AN EXPLOSION CAN OCCUR.

- (5) Do not put ground equipment below the wingtip when you refuel the airplane.
 - (a) The weight of the fuel pushes the wing down when you put the fuel in the tank.
 - (b) The wingtip goes down more than the other parts of the wing.
 - (c) Air comes out of the fuel tanks through the fuel vents in the wingtip.
 - (d) Dangerous concentrations of fuel fumes occur at the wingtip.

S 653-298

CAUTION: DO NOT OPERATE THE HYDRAULIC SYSTEM WHEN THE TANK THAT CONTAINS THE HEAT EXCHANGER FOR THAT HYDRAULIC SYSTEM IS EMPTY. THE HYDRAULIC SYSTEM BECOMES TOO HOT IF THE HEAT EXCHANGER IS NOT COVERED BY THE FUEL.

- (6) Do not operate a hydraulic system if the tank that contains the exchanger for that hydraulic system is empty.
 - (a) Do not operate the L hydraulic system (placard controls) if the left main tank is defueled.
 - (b) Do not operate the R or C hydraulic system (placard controls) if the right main tank is empty.
 - (c) If the hydraulic exchangers are not below the top level of the fuel, the system becomes too hot.

J. Airplane Separation Distance From Equipment Limits

S 653-299

WARNING: OBEY THE AIRPLANE SEPARATION DISTANCES DURING A REFUEL OPERATION. IF YOU DO NOT OBEY THESE REQUIREMENTS A FIRE OR AN EXPLOSION CAN OCCUR.

- (1) Maintain the separation distance for equipment or ignition sources given in Table 301.

EFFECTIVITY

ALL

12-11-01

03

Page 309
Dec 22/06

TABLE 301	
EQUIPMENT OR IGNITION SOURCES	REFUEL/DEFUEL SEPARATION DISTANCE * [1]
Adjacent airplane engine and APU	50 feet (15 meters)
Fuel service equipment – measured from engine or exhaust system	10 feet (3 meters) from fuel vents
Ground power units	20 feet (6 meters)
Airplane servicing equipment – measured from the engine or exhaust system	10 feet (3 meters)
Airplane servicing equipment during an overwing refuel operation	Not under the trailing edge of the wing
Electrical equipment that is likely to cause arcs or sparks	50 feet (15 meters)
Photographic equipment/flash units	10 feet (3 meters)
Battery powered equipment	10 feet (3 meters) from fuel servicing equipment or fuel spills * [2]
Open flames, heat sources, lighted smoking material and any other potential ignition sources	50 feet (15 meters)
Electrical transmitting equipment	Reference Table 302

* [1] The distance is measured from a point on the ground directly below the fuel vents or from fueling equipment.

* [2] Does not apply to battery powered equipment approved (by an independent testing laboratory) for use in Class I Division 1 hazardous locations.

K. Electrical/Electronic Systems Separation Distance Limits

EFFECTIVITY

ALL

12-11-01

02

Page 310
Aug 22/06

S 653-300

WARNING: OBEY THE ELECTRICAL SYSTEM SEPARATION DISTANCES DURING A REFUEL OPERATION. IF YOU DO NOT OBEY THESE REQUIREMENTS A FIRE OR AN EXPLOSION CAN OCCUR.

- (1) Maintain the separation distance for the electrical/electronic systems given in Table 302.

EFFECTIVITY

ALL

12-11-01

01

Page 311
Apr 22/06

TABLE 302	
POWER (EIRP *[1]) OF EQUIPMENT TRANSMITTING RADAR OR RADIO	REFUEL/DEFUEL SEPARATION DISTANCE *[2]
More than 100 watts (radio or radar)	200 feet (60 meters)
25 to 100 watts (radio or radar)	50 feet (15 meters)
Less than 25 watts *[3] *[4]	10 feet (3 meters)

- *[1] EIRP is effective Isotropic Radiated Power in watts.
- *[2] The distance is measured from a point on the ground directly below the fuel vents or from fueling equipment.
- *[3] This category includes mobile phones, pagers, two-way radios, etc. There are low power, very safe communication systems that are approved for use in hazardous locations. These devices can be used safely in areas that contain fuel vapor (UL 913 or equivalent standards).
- *[4] Phased array flat plate weather radar systems have an average power output of less than 5 watts.

EFFECTIVITY

ALL

12-11-01

01

Page 312
Dec 22/07

L. Fuel Servicing Equipment Precautions (Fig. 301)

S 653-301

WARNING: OBEY THE FUEL SERVICING EQUIPMENT PRECAUTIONS DURING A REFUEL OPERATION. IF YOU DO NOT OBEY THESE REQUIREMENTS; A FIRE OR AN EXPLOSION CAN OCCUR.

- (1) Obey all separation distance requirements (Table 301).

S 653-302

- (2) Use only approved fuel servicing equipment in a serviceable condition.

S 653-303

- (3) Do not disable the deadman shutoff controls.

NOTE: Wire, rope, or tools used to disable the deadman controls can prevent the immediate shutoff of pressurized fuel. A disabled deadman control can cause a fuel spill hazard.

S 653-304

- (4) When you position the fuel servicing vehicles, make sure the equipment:
- (a) Has a clear exit path at all times.
 - (b) Does not interfere with access to the aircraft for rescue or fire protection.
 - (c) Does not obstruct the passenger evacuation routes.
 - (d) Does not obstruct the emergency slide chute deployment areas.

M. Ground Equipment and Airplane Servicing Equipment Precautions

S 653-305

WARNING: OBEY THE FUEL SERVICING EQUIPMENT PRECAUTIONS DURING A REFUEL OPERATION. IF YOU DO NOT OBEY THESE REQUIREMENTS; A FIRE OR AN EXPLOSION CAN OCCUR.

- (1) Obey all separation distance requirements (Table 301).

S 653-306

- (2) Do not put ground equipment below the fuel system vents at the wingtips. The fuel tanks are vented through the wingtip vents. An explosive mixture of fuel vapor can exist at these locations.

S 653-307

- (3) Added fuel weight will compress the landing gear shock struts and lower the airplane. Make sure all stands, ladders, vehicles and equipment that can come in contact with the airplane are removed before the refuel operation begins.

N. Personnel Precautions

EFFECTIVITY

ALL

12-11-01

02

Page 313
Apr 22/06

S 653-308

WARNING: OBEY THE PERSONNEL PRECAUTIONS DURING A REFUEL OPERATION. IF YOU DO NOT OBEY THESE REQUIREMENTS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Personnel that refuel the airplane must be trained in the safe operation of these systems and procedures:
 - (a) 767 fuel servicing operations.
 - (b) Fuel servicing equipment
 - (c) Fuel spill prevention
 - (d) Emergency controls
 - (e) Emergency equipment
 - (f) Emergency fuel spill and fire protection procedures
 - (g) Fuel vapor hazard locations (wingtips, engine locations, etc.).

S 653-309

- (2) Personnel must wear eye protection (chemical splash goggles or safety glasses and face shield) during the connection of the fuel hose and during the initial pressurization of the hose after hookup.

S 653-310

- (3) At some airport locations, a fuel safety person may be needed to monitor the airplane refuel operations.

0. Fueling Zone

S 653-311

WARNING: OBEY THE FUELING ZONE PRECAUTIONS. IF YOU DO NOT OBEY THESE REQUIREMENTS, A FIRE OR AN EXPLOSION, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Refuel operations must only be done in airport approved areas. Correct separation distances must be available in these areas.

S 653-312

- (2) A fueling zone exists around the airplane anytime the airplane is being prepared for a refuel operation or during a refuel operation.

S 653-313

- (3) Fire protection equipment, emergency rescue equipment, approved fire extinguishers, must be available in these areas.

S 653-314

- (4) Within the fueling zone, obey these requirements:
 - (a) Obey the equipment separation requirements (Table 301 and 302).
 - (b) Only authorized persons and vehicles are permitted in the fueling zone.
 - (c) Passengers are not allowed in the fueling zone.

EFFECTIVITY

ALL

12-11-01

02

Page 314
Apr 22/06

- (d) All personnel must assume that a refuel operation is in progress any time a fuel service vehicle is in the fueling zone.
- (e) Limit maintenance activity on the airplane to work that does not increase the risk of igniting fuel vapor.
- (f) All electrical equipment must be rated for the hazardous location where it will operate.
- (g) Do not keep the vehicle engines running unless it is necessary for airplane maintenance or servicing.
- (h) Metal wheels or studded tires are not permitted.
- (i) Do not approach within 50 feet (15 meters) of the airplane with these items:
 - 1) Open flames.
 - 2) Heat sources.
 - 3) Lighted smoking material.
 - 4) Shoes with metal clips.
 - 5) Other potential ignition sources.

P. Adverse Weather Conditions Precautions

S 653-315

WARNING: STOP THE REFUEL OPERATION DURING ATMOSPHERIC ELECTRICAL ACTIVITY. DO NOT CONNECT A HEADSET AND DO NOT TOUCH ELECTRICAL CONNECTIONS TO THE AIRPLANE. LIGHTNING STRIKES CAN CAUSE INJURIES TO PERSONNEL, AND A FIRE OR EXPLOSION DURING A REFUEL OPERATION.

- (1) When thunderstorms or lightning are within a 10 mile (16 kilometer) radius of the immediate area, do these steps:
 - (a) Contact the airport authority, air traffic control, or flight deck crew for guidance on the decision to continue or suspend fueling operations.
 - (b) Stop the refuel operation when fueling operations are suspended.
 - (c) Disconnect and remove any external headsets.
 - (d) Do not touch any electrical connections.

S 943-316

- (2) Strong wind conditions can cause a build-up of static electricity. Large charges of static electricity can develop on support equipment while parked as a result of the movement of dust particles and air currents during strong wind conditions. Fueling procedures should stop if strong wind conditions are present.

S 653-317

- (3) Strong wind conditions can also cause the unwanted movement of items or equipment which can hit the airplane or injure persons. Wind gusts can damage the airplane structure. Fueling procedures should stop if strong wind conditions are present.

EFFECTIVITY

ALL

12-11-01

02

Page 315
Apr 22/06

S 943-318

- (4) Obey all of the approved procedures and precautions during a refuel operation.

TASK 12-11-01-603-319

3. Prepare the Airplane for a Refuel Operation

A. General

- (1) This task prepares the airplane for a refuel operation.

B. References

- (1) AMM 6-44-00/201, Wing Access Doors and Panels
- (2) AMM 12-11-01/301, Fuel Tank Pressure Fueling
- (3) AMM 12-11-03/301, Fuel System Draining
- (4) AMM 12-11-02/301, Overwing Refuel
- (5) AMM 20-41-00/201, Static Grounding
- (6) AMM 24-22-00/201, Manual Control
- (7) FIM 28-41-00/101, Fuel Quantity Indicating System
- (8) AMM 49-11-00/201, APU Power Plant

C. Access

(1) Location Zones

- | | |
|-----|--|
| 133 | Wing Center Section (Left) |
| 134 | Wing Center Section (Right) |
| 531 | Center Auxiliary Tank (Left) |
| 532 | Main Tank - Inboard of Rib No. 10 (Left) |
| 541 | Main Tank - Outboard of Rib No. 10 (Left) |
| 631 | Center Auxiliary Tank (Right) |
| 632 | Main Tank - Inboard of Rib No. 10 (Right) |
| 641 | Main Tank - Outboard of Rib No. 10 (Right) |

D. Prepare the Airplane

S 653-320

WARNING: OBEY THE REFUEL OPERATIONS PRECAUTIONS. IF YOU DO NOT OBEY THESE REQUIREMENTS, A FIRE OR AN EXPLOSION, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Read and obey the precautions in this task: Precautions and limits for Fuel Servicing.

S 653-321

- (2) Make sure the airplane has a ground attitude of $0.0^\circ \pm 2.0^\circ$ pitch nose down and $0^\circ \pm 2.0^\circ$ degree roll.

S 653-322

- (3) Sump the water from the fuel tanks before you start the refuel operation (AMM 12-11-03/301).

S 653-323

- (4) Make sure the wingtip pressure relief valves are closed.

EFFECTIVITY

ALL

12-11-01

02

Page 316
Dec 22/05

S 863-324

WARNING: MAKE SURE THE EXHAUST OF ADJACENT AIRCRAFT DOES NOT GO INTO A FLAMMABLE VAPOR ZONE DURING REFUELING. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (5) If an adjacent aircraft is operating its APU, make sure the APU exhaust stream does not go into a flammable vapor zone of your airplane (for example, the fuel vents or the area around the fueling station and the fueling vehicles).

S 863-380

- (6) Make sure these circuit breakers on the APU external power panel, P34, are closed:
- (a) 34L2, FUEL QTY REFUEL
 - (b) 34L3, FLNG CONT
 - (c) 34L5, VALVES FLNG

S 863-381

- (7) Make sure these circuit breakers on the main power distribution panel, P6, are closed:
- (a) 6E4, FUELING QTY
 - (b) 6E5, FUELING CONTROL
 - (c) 6E6, FUELING VALVES

S 863-382

- (8) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
- (a) 11C34, FUEL QTY 1
 - (b) 11M19, FUEL QTY 2

S 863-383

- (9) Make sure the six EICAS circuit breakers on the P11 panel are closed.

S 713-385

- (10) Push the ECS MSG switch on the EICAS MAINT panel on the right side panel, P61.

S 713-386

- (11) If the EICAS message, FUEL QTY IND, shows on the bottom display, do the Fuel Quantity BITE Procedure (FIM 28-41-00/101).

S 013-387

- (12) Open the fueling station door, 521QB (AMM 06-44-00/201).

EFFECTIVITY

ALL

12-11-01

02

Page 317
Aug 22/06

S 863-391

- (13) Make sure the fueling panel light comes on.

NOTE: The fueling panel light shows that there is electrical power at the fueling control panel.

- (a) If the fueling panel light does not come on, put the battery power switch in the BATT position.

S 653-325

- (14) For a pressure refuel operation, do these steps:

CAUTION: ATTACH BONDING CABLES ONLY TO SPECIFIED POINTS ON THE AIRPLANE. INCORRECTLY ATTACHED BONDING CABLES CAN CAUSE SCRATCHES. THESE SCRATCHES CAN CAUSE CORROSION AND CRACKS ON STRESSED PARTS. BONDING CABLES ATTACHED TO COMPOSITE DOORS OR FAIRINGS DO NOT GIVE AN ELECTRICAL BOND.

- (a) Connect a bonding cable from the fueling source to an approved electrical grounding or bonding connection on the airplane (AMM 20-41-00/201).

NOTE: If the fueling source has a permanently attached grounding/bonding cable, you can use it in this step. You can use the grounding connection immediately outboard of the refuel station to bond the airplane to the fuel truck.

- (b) Supply the electrical power (AMM 24-22-00/201).
(c) If you do not have 115-volt ac power (external power), put the battery switch in the BATT position.

NOTE: This permits you to do the refueling operation with power from the airplane battery.

WARNING: OBEY THE PROCEDURES FOR OPERATING THE APU DURING THE FUELING OPERATION. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (d) If the APU is operating during refueling, do these steps:
1) Obey the limits for the operation of the APU (AMM 49-11-00/201).
2) You can start the APU during refueling if the start is an initial start or a restart after normal shutdown.
3) You can shut down the APU (manual or automatic) during the refueling operation.

EFFECTIVITY

ALL

12-11-01

01

Page 318
Aug 22/04

- 4) If the low pressure indication light comes on for the APU DC fuel pump, immediately shut down the APU (AMM 49-11-00/201) so the pump will shut off. The switch for the APU DC fuel pump will not shut off the pump if the APU is operating.

WARNING: DO NOT START THE APU AGAIN DURING THE REFUELING OPERATION IF THERE IS A PROTECTIVE AUTOMATIC SHUTDOWN OF THE APU OR A FAILURE TO START CONDITION. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- 5) If there is a protective automatic shutdown or failure to start condition on the APU, do one of these steps:
- a) Complete the refueling operation before you try to start the APU again.
 - b) Stop the refueling operation and disconnect the fuel hoses from the adapter before you try to start the APU again.

WARNING: DO THESE STEPS IF AN APU FIRE OCCURS DURING REFUELING. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- 6) If an APU fire occurs, do these steps in this sequence:
- a) Stop the refueling operation:
 - b) The APU should shut down automatically. If it does not shut down automatically, do this task: APU Emergency Shutdown (AMM 49-11-00/201).
 - c) Discharge the APU fire bottles (AMM 49-11-00/201).
 - d) Notify persons on board the airplane and Airport Fire Services.

EFFECTIVITY

ALL

12-11-01

02

Page 319
Aug 22/07

WARNING: DO THESE STEPS IF FUEL SPILLAGE OCCURS DURING REFUELING. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- 7) If fuel spillage occurs, do these steps:
- a) Stop the refueling operation
 - b) Notify person on board the airplane.
 - c) Unload the APU and shut it down. To do this, do this task: APU Usual Shutdown (AMM 49-11-00/201).
 - d) Do not start the APU again until the spilled fuel is removed and there is no further risk of spilled fuel or vapors.

WARNING: MAKE SURE FUELING VEHICLES ARE NOT PARKED IN THE EXHAUST STREAM OF THIS AIRPLANE OR ANY ADJACENT AIRPLANES. THE HOT EXHAUST CAN CAUSE A FIRE OR EXPLOSION.

- 8) Make sure the fueling vehicles are in a position that avoids any risk of coming in the path of the APU exhaust stream.

NOTE: Make sure the APU exhaust stream does not impinge on fueling vehicles for other airplanes. Make sure the fueling vehicles for this airplane are out of the APU exhaust stream of adjacent airplanes.

- a) Make sure the exhaust from the APU does not go into any flammable vapor zone (for example, another aircraft during fueling).
- (e) Do the Pressure Refuel Operation (AMM 12-11-01/301).

S 653-326

- (15) For an overwing refuel operation, do these steps:

WARNING: MAKE SURE THE AIRPLANE AND THE FUEL TRUCK ARE CORRECTLY GROUNDED. IF THE AIRPLANE AND FUEL TRUCK ARE NOT CORRECTLY GROUNDED, AN EXPLOSION, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR:

- (a) Ground the airplane and the fuel truck (AMM 20-41-00/201).

WARNING: DO NOT REMOVE THE FILLER CAPS BEFORE YOU GROUND THE FUEL NOZZLES. IF YOU DO NOT GROUND THE FUEL NOZZLES, A FIRE OR AN EXPLOSION, INJURY TO PERSONS, AND DAMAGE TO EQUIPMENT CAN OCCUR.

EFFECTIVITY

ALL

12-11-01

02

Page 320
Aug 22/07

WARNING: MAKE SURE YOU GROUND THE FUEL NOZZLES BEFORE YOU ATTACH THE FUEL HOSE. IF YOU DO NOT GROUND THE FUEL NOZZLES, A FIRE OR AN EXPLOSION, INJURY TO PERSONS, AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (b) Ground the refuel nozzles to the ground jacks adjacent to the fill ports with the nozzle bonding cable.

WARNING: DO NOT OPERATE THE APU DURING AN OVERWING REFUEL OPERATION. A FIRE OR EXPLOSION, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (c) If you must operate the refuel quantity indicators during the overwing refuel operation, supply external electrical power (AMM 24-22-00/201).

NOTE: The airplane battery does not have enough life to complete the gravity-fed overwing refuel operation.

- (d) Do the Overwing Refuel Operation (AMM 12-11-02/301).
- (e) Stop the fueling source.

TASK 12-11-01-653-406

4. Fueling With Electrical Power - Automatic Operation (Fig. 301)

A. General

- (1) This task uses the pressure refuel system to refuel the airplane.

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 12-11-01/301, Fuel Tank Pressure Fueling
- (3) AMM 20-41-00/201, Static Grounding
- (4) AMM 24-22-00/201, Standby 115-Volt AC Power Generation
- (5) AMM 27-81-00/201, Leading Edge Flap System
- (6) AMM 28-26-00/201, Defueling
- (7) FIM 28-41-00/101, Fuel Quantity Indicating System

EFFECTIVITY

ALL

12-11-01

02

Page 321
Dec 22/05

(8) WDM 28-21-11, Fueling Control

C. Access

(1) Location Zones

521 Leading Edge to Front Spar, Left

(2) Access Panels

521QB Fueling Station Door (Left)

D. Prepare the Airplane for a Refuel Operation

S 653-328

WARNING: OBEY ALL THE REFUEL OPERATIONS PRECAUTIONS. FAILURE TO OBEY THE REFUEL PRECAUTIONS CAN CAUSE SERIOUS INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Read and obey the precautions in this task: Precautions and Limits for Fuel Servicing.

S 653-329

(2) Do this task: Prepare the Airplane for a Refuel Operation.

E. Connect the Fueling Equipment

S 653-330

(1) Do the operator supplied procedures to position the fuel vehicle.

S 423-331

(2) Connect the bonding cable attached to the refuel nozzle to an approved airplane electrical ground (AMM 20-41-00/201).

NOTE: The bonding cable is not necessary if there is electrical continuity between the fueling source and the fueling nozzle.

S 423-332

(3) Connect the fuel hose to the fueling receptacle adapter:

(a) Remove the cap for the fueling receptacles.

(b) Make sure there are no fuel leaks.

(c) Make sure the fueling receptacle adapter is clean and not damaged.

EFFECTIVITY

ALL

12-11-01

03

Page 322
Dec 22/05

- (d) Connect the fueling nozzles to one or two of the refuel receptacle adapters.
- (e) Repeat these steps for each fuel hose.

S 713-333

- (4) Push the TEST IND switch on the fueling control panel to do a test on the load select indicators.

S 713-334

- (5) Make sure all eights (8) show on the top and bottom displays of the load select indicators.

NOTE: If PUSH SET shows on the fuel quantity indicator display there is a FQIS failure. The FQIS failure will not let the FQIS system stop the fueling operation at the fuel quantity selected. You must do the fuel quantity BITE procedure on the FQIS processor menus "PRESENT FAULTS ?" and "FAULT HISTORY ?" to correct the problem. For the "FAULT HISTORY ?" menu, you only have to look at the FLIGHT LEG 0 faults (FIM 28-41-00/101, Fig. 104).

NOTE: You can continue to fuel the airplane if you push the SET button. The upper and lower display will go off, or they will flash on and off while the fuel quantity is shown in the display. If the fuel quantity indication flashes on and off the actual fuel quantity shown can be incorrect. To continue fueling you must fuel the airplane manually. To do this you will need to use the fuel measuring sticks to make sure you have the correct quantity of fuel in the fuel tanks.

NOTE: If the message "-A.-", "-b.-", or "-A.b" shows on the fuel quantity indicators there is a bus A, bus B, or bus A and B failure. To correct the problem, do the procedure for Intermittent Fault Messages (FIM 28-41-00/101, Fig. 110).

NOTE: The FQIS will continue to operate if one bus (A or B) is bad. You can continue to fuel the airplane if only one bus (A or B) is bad.

NOTE: If the two busses (A and B) are bad the message "-A.b" will show and all indicators will go off. You can continue to fuel the airplane by the "Fueling Without Electrical Power" procedure (AMM 12-11-01/301).

EFFECTIVITY

ALL

12-11-01

02

Page 323
Aug 22/08

S 713-335

- (6) Push and release each fueling valve light.
 - (a) Make sure each fueling valve light comes on and then goes off.

S 713-336

- (7) Make sure the fueling panel light comes on.

NOTE: The fueling panel light shows that there is electrical power at the fueling control panel.

- (a) If the fueling panel light does not come on, put the battery power switch in the BATT position.

F. Prepare the Fuel Sheet

S 973-337

- (1) Use the operator supplied fuel sheet to record the pre-uplift fuel quantity for each tank.

S 973-338

- (2) Calculate the fuel to be uplifted converted to volume (if necessary).

S 973-339

CAUTION: DO NOT EXCEED THE FUEL SYSTEM LIMITATIONS (WEIGHT AND BALANCE MANUAL SEC 1-20). DAMAGE TO THE AIRPLANE COULD OCCUR.

- (3) Record the uplift quantity on the fuel sheet (if necessary).

G. Pressure Refuel Setup

S 653-340

- (1) Start the automatic fueling operation.
 - (a) For each fuel tank that you are to refuel, set the fuel quantity as follows:
 - 1) At the LOAD SELECT control, set the thumbwheel switches to the quantity of fuel to be added.
 - 2) Push the SET switch for the applicable fuel tank for 1 second and release.

EFFECTIVITY

ALL

12-11-01

02

Page 324
Aug 22/04

NOTE: If the message "FAIL" shows in the bottom display, there is a load select control unit (LSCU) failure. Do a check of the load select control unit, M638, and the applicable wiring (WDM 28-21-11).

- 3) Make sure that quantity on the LOAD SELECT control shows on the bottom display of the applicable LOAD SELECT indicator.
 - a) If you make an error during the selection procedure, push the applicable SET switch and do the procedure again.

(b) Put the applicable fueling valve switches to the FUEL position.

S 863-341

- (2) Make sure the onboard fuel load is in a valid fuel distribution configuration (equivalent to after a flight operation).

H. Begin the Refuel Operation

S 653-342

- (1) Activate the fuel shutoff control switch (deadman switch) to start the fuel flow.

S 653-343

CAUTION: DO NOT USE MORE THAN 55 PSI FUEL PRESSURE AT THE NOZZLE. DAMAGE TO THE REFUEL SYSTEM CAN OCCUR.

- (2) Make sure the refuel pressure is between 35 and 55 psi.
 - (a) If one FUELING VALVES light (INBD or OUTBD; LEFT or RIGHT) for the applicable fuel tank did not come on and the other FUELING VALVES light for that tank did come on, continue with the automatic fueling operation.

NOTE: Only one fueling shutoff valve opened. The rate that fuel flows into the fuel tank decreases. The fueling shutoff valve that is open will close automatically when the set quantity of fuel is reached.

EFFECTIVITY

ALL

12-11-01

03

Page 325
Dec 22/05

 **BOEING**
767
MAINTENANCE MANUAL

- (b) If the two FUELING VALVES lights (INBD and OUTBD; LEFT and RIGHT) for the applicable fuel tank did not come on, do the steps that follow:

NOTE: None of the two fueling shutoff valves opened. The two fueling shutoff valves are damaged or the FQIS processor does not let the fueling shutoff valves open in the automatic fueling mode.

- 1) Continue the automatic fueling operation for all the applicable fuel tanks with FUELING VALVES lights that are on.
 - 2) Do the manual fueling operation for the fuel tank that the FUELING VALVES lights did not come on.
- (c) Push the TEST SYSTEM switch on the fueling control panel.
(d) Make sure the FUELING VALVES lights go off then come on in sequence.

S 713-344

- (3) To do an overfill system test, do the steps that follow:

NOTE: It is not necessary to do this test for each refueling.

CAUTION: DO NOT USE MORE THAN 35 PSI FUEL PRESSURE AT THE FUELING NOZZLE FOR THE OVERFILL SYSTEM TEST. IF YOU USE MORE THAN 35 PSI FUEL PRESSURE, YOU CAN CAUSE DAMAGE TO THE REFUELING SYSTEM COMPONENTS.

- (a) Reduce the fueling nozzle pressure to 35 psi.
- (b) Push the OVERFILL TEST switch on the fueling control panel.
- (c) Make sure the blue FUELING VALVES lights go off.

NOTE: This shows the fueling shutoff valves are closed.

- (d) Push the OVERFILL RESET switch on the fueling control panel.

EFFECTIVITY

ALL

12-11-01

02

Page 326
Aug 22/04

(e) Make sure the blue FUELING VALVES lights come on.

NOTE: This shows the fueling shutoff valves are open.

S 653-345

(4) Make sure the left and right wing fuel tanks refuel at approximately the same rate.

S 653-346

(5) Monitor the fueling quantity indicators and the refuel valve indication lights.

I. Stop the Refuel Operation

S 653-352

(1) When fueling is completed, put the FUELING VALVES switches for all the applicable fuel tanks to the OFF position.

NOTE: The FQIS processor automatically closes the applicable fueling shutoff valves when the set fuel quantity is put in the fuel tank or the fuel tank is full.

(a) Make sure the refuel valve position lights are off.

S 653-356

(2) Release the deadman switch to stop the fuel flow when all of the refuel valve position lights are off.

S 863-357

(3) Make sure the onboard fuel load is in a valid pre-flight fuel distribution.

S 653-358

(4) Transfer fuel to balance the fuel load if necessary (AMM 28-26-00/201).

EFFECTIVITY

ALL

12-11-01

02

Page 327
Aug 22/05

S 863-359
(5) Wait 1 minute to let the FQIS system stabilize.

S 973-360
(6) Record the actual fuel quantities from the fueling quantity indicators.

S 973-361
(7) Record the actual fuel quantity from the fuel vehicle flow meter.

S 973-362
(8) Do the discrepancy check and make sure it is within limits.

NOTE: Per operator's requirement.

S 973-363
(9) Complete the Fuel Sheet.

S 973-364
(10) Complete the Delivery Receipt if necessary.

S 973-365
(11) Give a copy of the forms to the airline representative or flight crew.

J. Put the Airplane Back to the Usual Condition

S 863-366
(1) Make sure all FUELING VALVE lights are OFF and the FUELING VALVE switches are in the closed position.

S 863-367
(2) If the battery power switch is in the BATT position, put the battery power switch to the NORMAL position.

EFFECTIVITY

ALL

12-11-01

02

Page 328
Aug 22/04

S 023-368

- (3) Disconnect the refuel nozzle(s) from the airplane (Fig. 301).

S 023-369

- (4) Remove the fueling nozzle bonding cable (if installed).

S 213-370

- (5) Make sure the fueling receptacle adapter is not damaged.

S 423-371

CAUTION: MAKE SURE YOU REPLACE THE FUELING ADAPTER CAP. DAMAGE TO THE SLAT CONTROL MECHANISM CAN OCCUR.

- (6) Install the cap for the fueling receptacles if you removed it to get access to the fueling adapter.

S 413-372

- (7) Close and securely latch the fueling station door, 521QB (AMM 06-44-00/201).

S 023-376

- (8) Disconnect the bonding/grounding cables that you connected between the fueling source and the airplane (AMM 20-41-00/201).

S 863-377

- (9) Do the operator supplied procedures to remove the fuel servicing vehicle.

TASK 12-11-01-653-021

5. Fueling With Electrical Power - Manual Operation (Fig. 301)

A. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
(2) AMM 12-11-01/301, Fuel Tank Pressure Fueling
(3) AMM 20-41-00/201, Static Grounding

EFFECTIVITY

ALL

12-11-01

06

Page 329
Dec 22/05

- (4) AMM 32-00-15/201, Landing Gear Door Locks
- (5) AMM 32-00-20/201, Landing Gear Downlocks
- (6) FIM 28-41-00/101, Fuel Quantity Indicating System

B. Access

(1) Location Zones

- 133 Wing Center Section (Left)
- 134 Wing Center Section (Right)
- 521 Leading Edge to Front Spar (Left)
- 551 Rear Spar to MLG Support Beam (Left)
- 561 Rear Spar to Trailing Edge (Left)
- 651 Rear Spar to MLG Support Beam (Right)
- 661 Rear Spar to Trailing Edge (Right)

(2) Access Panels

- 521QB Fueling Station Door (Left)
- 551TB Access Panel (Left)
- 561GB Access Panel (Left)
- 651TB Access Panel (Right)
- 661GB Access Panel (Right)

C. Preparation

S 653-407

WARNING: OBEY ALL THE REFUEL OPERATIONS PRECAUTIONS. FAILURE TO OBEY THE REFUEL PRECAUTIONS CAN CAUSE SERIOUS INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Read and obey the precautions in this task: Precautions and Limits for Fuel Servicing.

S 653-395

- (2) Do this task: Prepare the Airplane for a Refuel Operation.

D. Connect the Fueling Equipment

S 653-396

- (1) Do the operator supplied procedures to position the fuel vehicle.

EFFECTIVITY

ALL

12-11-01

06

Page 330
Dec 22/05

S 423-397

- (2) Connect the bonding cable attached to the refuel nozzle to an approved airplane electrical ground (AMM 20-41-00/201).

NOTE: The bonding cable is not necessary if there is electrical continuity between the fueling source and the fueling nozzle.

S 423-398

- (3) Connect the fuel hose to the fueling receptacle adapter:
 - (a) Remove the cap for the fueling receptacles.
 - (b) Make sure there are no fuel leaks.
 - (c) Make sure the fueling receptacle adapter is clean and not damaged.
 - (d) Connect the fueling nozzles to one or two of the refuel receptacle adapters.
 - (e) Repeat these steps for each fuel hose.

E. Pressure Refuel Setup

S 713-399

- (1) Push the TEST IND switch on the fueling control panel to do a test on the load select indicators.

S 713-400

- (2) Make sure all eights (8) show on the top and bottom displays of the load select indicators.

EFFECTIVITY

ALL

12-11-01

06

Page 331
Apr 22/05

NOTE: If the message "PUSH SET" shows on the fuel quantity indicator display there is a FQIS failure. The FQIS failure will not let the FQIS system stop the fueling operation at the fuel quantity selected. You must do the fuel quantity BITE procedure on the FQIS processor menus "PRESENT FAULTS ?" and "FAULT HISTORY ?" to correct the problem. For the "FAULT HISTORY ?" menu, you only have to look at the FLIGHT LEG 0 faults (FIM 28-41-00/101, Fig. 104).

NOTE: You can continue to fuel the airplane if you push the SET button. The upper and lower display will go off, or they will flash on and off while the fuel quantity is shown in the display. If the fuel quantity indication flashes on and off the actual fuel quantity shown can be incorrect. To continue fueling you must fuel the airplane manually. To do this you will need to use the fuel measuring sticks to make sure you have the correct quantity of fuel in the fuel tanks.

NOTE: If the message "-A.-", "-b.-", or "-A.b" shows on the fuel quantity indicators there is a bus A, bus B, or bus A and B failure. To correct the problem, do the procedure for Intermittent Fault Messages (FIM 28-41-00/101, Fig. 110).

NOTE: The FQIS will continue to operate if one bus (A or B) is bad. You can continue to fuel the airplane if only one bus (A or B) is bad.

NOTE: If the two busses (A and B) are bad the message "-A.b" will show and all indicators will go off. You can continue to fuel the airplane by the "Fueling Without Electrical Power" procedure (AMM 12-11-01/301).

S 713-401

- (3) Push and release each fueling valve light.
 - (a) Make sure each fueling valve light comes on and then goes off.

S 713-402

- (4) Make sure the fueling panel light comes on.

NOTE: The fueling panel light shows that there is electrical power at the fueling control panel.

- (a) If the fueling panel light does not come on, put the battery power switch in the BATT position.

F. Prepare the Fuel Sheet

S 973-403

- (1) Use the operator supplied fuel sheet to record the pre-uplift fuel quantity for each tank.

EFFECTIVITY

ALL

12-11-01

02

Page 332
Apr 22/08

S 973-404

- (2) Calculate the fuel to be uplifted converted to volume (if necessary).

S 973-405

CAUTION: DO NOT EXCEED THE FUEL SYSTEM LIMITATIONS (WEIGHT AND BALANCE MANUAL SEC 1-20). DAMAGE TO THE AIRPLANE COULD OCCUR.

- (3) Record the uplift quantity on the fuel sheet (if necessary).

G. Start the Refuel Operation

S 863-065

- (1) To open the fueling shutoff valves, do the steps that follow:
 - (a) Put the applicable FUELING VALVES switches to the FUEL position.
 - (b) Start the fueling source.
 - (c) Make sure the applicable FUELING VALVES lights come on.
 - (d) If an applicable FUELING VALVES light does not come on, the fueling shutoff valve did not open.
 - (e) To open the fueling shutoff valves manually, do the steps that follow:
 - 1) Stop the fueling source.
 - 2) To get access to the inboard fueling shutoff valve in the left main fuel tank, remove the access panel, 551TB (AMM 06-44-00/201).
 - 3) To get access to the inboard fueling shutoff valve in the right main fuel tank, remove the access panel, 651TB (AMM 06-44-00/201).
 - 4) To get access to the outboard fueling shutoff valve in the left main fuel tank, remove the access panel, 561GB (AMM 06-44-00/201).
 - 5) To get access to the outboard fueling shutoff valve in the right main fuel tank, remove the access panel, 661GB (AMM 06-44-00/201).

EFFECTIVITY

ALL

12-11-01

02

Page 333
Dec 22/04

 **BOEING**
767
MAINTENANCE MANUAL

- 6) To get access to the fueling shutoff valves in the auxiliary fuel tank, do the steps that follow:
- a) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

WARNING: USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- b) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

CAUTION: MAKE SURE PRESSURE IS RELEASED FROM THE FUELING MANIFOLD BEFORE YOU MANUALLY OPEN THE FUELING SHUTOFF VALVES. IF THERE IS PRESSURE IN THE FUELING MANIFOLD WHEN YOU MANUALLY OPEN THE FUELING SHUTOFF VALVES, DAMAGE TO THE FUELING SHUTOFF VALVE OR THE FUELING MANIFOLD CAN OCCUR.

- 7) Make sure pressure is released from the fueling manifold.

NOTE: Pressure automatically releases from the fueling manifold through the drain check valve when you remove the pressure from the fueling source.

CAUTION: DO NOT REMOVE THE COVER PLATE LOCKWIRE, SCREWS, OR THE COVER PLATE. FUEL LEAKAGE CAN OCCUR AND CAUSE DAMAGE TO EQUIPMENT.

- 8) Turn the manual override thumbscrew (knurled knob) 10 to 13 turns in the counterclockwise direction to open the applicable fueling shutoff valve manually.

NOTE: It is necessary to use pliers to initially loosen the manual override thumbscrew.

EFFECTIVITY

ALL

12-11-01

06

Page 334
Aug 22/04

CAUTION: BE CAREFUL DURING FUELING IF THE FUELING SHUTOFF VALVES ARE OPENED MANUALLY. THERE IS NO ELECTRICAL SHUTDOWN (VOLUMETRIC OR OVERFILL SHUTDOWN) PROTECTION FOR FUELING SHUTOFF VALVES THAT ARE MANUALLY OPENED.

9) Start the fueling source.

S 213-090

(2) Monitor the fuel quantity on the LOAD SELECT indicator.

H. Stop the Refuel Operation

S 653-091

CAUTION: DO NOT USE THE TEST SYSTEM, OVERFILL TEST OR FUELING VALVES SWITCHES ON THE FUELING CONTROL PANEL, P28, TO STOP THE FUELING OPERATION. LARGE SURGE PRESSURES CAN RESULT AND CAUSE DAMAGE TO EQUIPMENT.

(1) Stop the fueling source when you get the correct quantity of fuel in the applicable fuel tank.

S 863-089

(2) To close the applicable fueling shutoff valves, do the steps that follow:

NOTE: The TEST SYSTEM, OVERFILL TEST or FUELING VALVES switches on the fueling control panel do not close a fueling shutoff valve opened manually.

(a) Put the applicable FUELING VALVES switches to the OFF position for the fuel tanks with the correct quantity of fuel.

(b) If you opened a fueling shutoff valve manually, do the steps that follow to close that fueling shutoff valve manually:

CAUTION: REMOVE PRESSURE FROM THE FUELING MANIFOLD BEFORE YOU MANUALLY CLOSE THE FUELING SHUTOFF VALVES. IF YOU DO NOT REMOVE THE PRESSURE, DAMAGE TO THE FUELING SHUTOFF VALVE OR FUELING MANIFOLD CAN OCCUR.

1) Make sure there is no pressure in the fueling manifold.

NOTE: The fueling manifold automatically releases pressure through the drain check valve when the fueling source pressure is removed.

EFFECTIVITY

ALL

12-11-01

03

Page 335
Dec 22/04

 **BOEING**
767
MAINTENANCE MANUAL

- 2) Turn the manual override thumbscrew (knurled knob) on the fueling shutoff valve 10 to 13 turns in the clockwise direction until the manual override thumbscrew is tightened.
- 3) Install the lockwire on the manual override thumbscrew (knurled knob).
- 4) Do the procedure again until all the fueling shutoff valves are closed.

S 653-092

- (3) Do the fueling procedure again until all the fuel tanks contain the correct quantity of fuel.

S 413-093

- (4) Install the applicable access panel, 551TB, 651TB, 561GB or 661GB, if removed (AMM 06-44-00/201).

S 093-068

WARNING: USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (5) Remove the door locks from the landing gear doors and close the doors, if opened (AMM 32-00-15/201).

S 653-035

- (6) Stop the fueling source.

S 653-036

- (7) Disconnect the fueling nozzles from the fueling adapters.

S 433-097

CAUTION: MAKE SURE YOU REPLACE THE FUELING ADAPTER CAP. DAMAGE TO THE SLAT CONTROL MECHANISM CAN OCCUR.

- (8) Install the fueling adapter cap if you removed it to get access to the fueling adapter.

EFFECTIVITY

ALL

12-11-01

03

Page 336
Dec 22/04

- S 093-037
- (9) Disconnect the bonding cable that you connected between the fueling source and the airplane.
- S 863-038
- (10) If the battery power switch is in the BATT position, put the battery power switch to the NORM position.
- S 413-039
- (11) Close fueling station door, 521QB (AMM 06-44-00/201).

TASK 12-11-01-653-040

6. Fueling Without Electrical Power

A. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 20-10-23/401, Lockwires
- (3) AMM 20-41-00/201, Static Grounding
- (4) AMM 28-44-00/201, Fuel Measuring Stick
- (5) AMM 32-00-15/201, Landing Gear DoorLocks
- (6) AMM 32-00-20/201, Landing Gear Downlocks

B. Access

(1) Location Zones

- 133 Wing Center Section (Left)
- 134 Wing Center Section (Right)
- 521 Leading Edge to Front Spar (Left)
- 551 Rear Spar to MLG Support Beam (Left)
- 561 Rear Spar to Trailing Edge (Left)
- 651 Rear Spar to MLG Support Beam (Right)
- 661 Rear Spar to Trailing Edge (Right)

(2) Access Panels

- 521QB Fueling Station Door (Left)
- 551TB Access Panel (Left)
- 561GB Access Panel (Left)
- 651TB Access Panel (Right)
- 661GB Access Panel (Right)

C. Procedure

NOTE: If you make a decision not to do this recommended procedure, you must have an alternative procedure. Make sure the conditions during the fueling operation give sufficient protection to the persons and equipment used in the procedure. It is possible that local fire codes and standards make it necessary to use different procedures or more procedures than those defined in the subsequent steps.

EFFECTIVITY

ALL

12-11-01

04

Page 337
Dec 22/04

S 653-392

WARNING: OBEY ALL THE REFUEL OPERATIONS PRECAUTIONS. FAILURE TO OBEY THE REFUEL PRECAUTIONS CAN CAUSE SERIOUS INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Read and obey the precautions in this task: Precautions and Limits for Fuel Servicing.

S 653-393

- (2) Do this task: Prepare the Airplane for a Refuel Operation.

S 423-409

CAUTION: ATTACH BONDING CABLES ONLY TO SPECIFIED POINTS ON THE AIRPLANE. BONDING CABLES ATTACHED TO COMPOSITE DOORS OR FAIRINGS DO NOT GIVE AN ELECTRICAL BOND. INCORRECTLY ATTACHED BONDING CABLES CAN CAUSE SCRATCHES. THESE SCRATCHES CAN CAUSE CORROSION AND CRACKS ON STRESSED PARTS.

- (3) Connect a bonding cable from the fueling source to an approved electrical grounding or bonding connection on the airplane. (AMM 20-41-00/201)

NOTE: If the fueling source has a permanently attached grounding/bonding cable, you can use it in this step.

S 483-411

WARNING: DO NOT PUT GROUND EQUIPMENT UNDER THE WINGTIPS DURING THE FUELING OPERATION. THE WINGS MOVE DOWN UNDER THE WEIGHT OF THE FUEL AND THE WINGTIPS MOVE THE MOST. BECAUSE THE FUEL TANKS ARE VENTED THROUGH THE WINGTIPS, A DANGEROUS AND EXPLOSIVE MIXTURE AROUND THE WINGTIP CAN OCCUR.

WARNING: DO NOT OPERATE THE HF COMMUNICATION SYSTEM DURING FUELING OPERATIONS.

CAUTION: DO NOT MANUALLY CLOSE THE FUELING SHUTOFF VALVES TO DECREASE OR STOP FUELING. THERE IS NO AUTOMATIC SHUTDOWN OR OVERFILL PROTECTION WITHOUT ELECTRICAL POWER. IF YOU MANUALLY CLOSE THE FUELING SHUTOFF VALVES DURING FUELING, PRESSURE SURGES AND DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (4) To get access to the inboard fueling shutoff valve in the left main fuel tank, remove the access panel, 551TB (AMM 06-44-00/201).

EFFECTIVITY

ALL

12-11-01

09

Page 338
Apr 22/06

S 013-073

- (5) To get access to the inboard fueling shutoff valve in the right main fuel tank, remove the access panel, 651TB (AMM 06-44-00/201).

S 013-074

- (6) To get access to the outboard fueling shutoff valve in the left main fuel tank, remove the access panel, 561GB (AMM 06-44-00/201).

S 013-075

- (7) To get access to the outboard fueling shutoff valve in the right main fuel tank, remove the access panel, 661GB (AMM 06-44-00/201).

S 013-076

- (8) To get access to the fueling shutoff valves in the auxiliary fuel tank, do the steps that follow:
(a) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

WARNING: USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (b) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 213-077

CAUTION: REMOVE THE PRESSURE FROM THE FUELING MANIFOLD BEFORE YOU MANUALLY OPEN THE FUELING SHUTOFF VALVE. IF YOU DO NOT REMOVE THE PRESSURE, DAMAGE TO THE FUELING SHUTOFF VALVE OR THE FUELING MANIFOLD CAN OCCUR.

- (9) Make sure pressure is released from the fueling manifold.

NOTE: The fueling manifold automatically releases pressure through the fueling shutoff valve when the fueling source pressure is removed.

EFFECTIVITY

ALL

12-11-01

08

Page 339
Aug 22/04

S 433-041

CAUTION: DO NOT REMOVE THE COVER PLATE LOCKWIRE, SCREWS OR THE COVER PLATE. FUEL LEAKAGE CAN OCCUR AND CAUSE DAMAGE.

- (10) Turn the manual override thumbscrew (knurled knob) 10 to 13 turns in the counterclockwise direction to open the fueling shutoff valve manually.

NOTE: It is necessary to use pliers to initially loosen the manual override thumbscrew.

S 013-042

- (11) Open the fueling station door, 521QB (AMM 06-44-00/201).

S 333-248

- (12) Connect the fuel hose to the refuel receptacle adapter:
(a) Remove the refuel receptacle caps.
(b) Make sure there are no fuel leaks.

CAUTION: MAKE SURE THE REFUEL RECEPTACLE ADAPTER IS CLEAN AND NOT DAMAGED. A DAMAGED ADAPTER CAN CAUSE A FUEL LEAK. A FUEL LEAK CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (c) Make sure the refuel receptacle adapter is clean and not damaged (Fig. 301).
(d) Connect the fueling nozzles to one or two of the refuel receptacle adapters.

S 983-045

- (13) Lower the fuel measuring sticks for the applicable fuel tanks (AMM 28-44-00/201).

EFFECTIVITY

ALL

12-11-01

07

Page 340
Aug 22/04

S 973-080

- (14) Calculate the quantity of fuel in the fuel tank and the quantity you want to put in the fuel tank.

S 653-081

CAUTION: DO NOT USE MORE THAN 55 PSI FUEL PRESSURE AT THE FUELING NOZZLE. IF YOU USE MORE THAN 55 PSI FUEL PRESSURE, DAMAGE TO THE FUELING SYSTEM COMPONENTS CAN OCCUR.

CAUTION: DO NOT USE JET B/JP-4 FUEL WITH GENERAL ELECTRIC MODEL CF6-80C2 ENGINES WITH DRIBBLE FUEL NOZZLES, (P/N'S 9331M72P33/P34/P41 AND 1968M49P07/P08). LOOK AT THE FUEL PANEL MARKER FOR FUEL TYPE RESTRICTIONS.

- (15) Start the fueling source.

S 213-047

- (16) Monitor the fuel quantity in the fuel tanks with the fuel measuring sticks (AMM 28-44-00/201).

S 653-048

- (17) Stop the fueling source when the necessary quantity of fuel is put in the fuel tank.

S 213-082

CAUTION: REMOVE THE PRESSURE FROM THE FUELING MANIFOLD BEFORE YOU MANUALLY CLOSE THE FUELING SHUTOFF VALVE. IF YOU DO NOT REMOVE PRESSURE, DAMAGE TO THE FUELING SHUTOFF VALVE OR FUELING MANIFOLD CAN OCCUR.

- (18) Make sure there is no pressure in the fueling manifold.

NOTE: The fueling manifold automatically releases pressure through the drain check valve when the fueling source pressure is removed.

EFFECTIVITY

ALL

12-11-01

04

Page 341
Aug 22/07

S 983-049

- (19) To close the fueling shutoff valves manually, do the steps that follow:
- (a) Turn the manual override thumbscrew (knurled knob) 10 to 13 turns in the clockwise direction until the manual override thumbscrew is tightened.
 - (b) Install the lockwire on the manual override thumbscrew (knurled knob) of the fueling shutoff valve (AMM 20-10-23/401).

S 413-083

- (20) Install the applicable access panel, 551TB, 651TB, 561GB or 661GB, if removed (AMM 06-44-00/201).

S 413-084

WARNING: USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (21) Remove the door locks from the landing gear doors and close the doors, if opened (AMM 32-00-15/201).

S 653-050

- (22) Disconnect the fueling nozzles from the fueling adapters.

S 433-100

CAUTION: MAKE SURE YOU REPLACE THE FUELING ADAPTER CAP. DAMAGE TO THE SLAT CONTROL MECHANISM CAN OCCUR.

- (23) Install the fueling adapter cap if you removed it to get access to the fueling adapter.

S 093-051

- (24) Disconnect the bonding cable that you connected between the fueling source and the airplane.

EFFECTIVITY

ALL

12-11-01

07

Page 342
Aug 22/04

S 413-052
(25) Close the fueling station door, 521QB (AMM 06-44-00/201).

EFFECTIVITY

ALL

12-11-01

06

Page 343
Aug 22/04

FUEL TANK OVERWING FUELING-SERVICING

TASK 12-11-02-653-010

1. Refuel the Airplane (Fig. 301)

A. General

- (1) Overwing fueling of the main fuel tanks is done if pressure fueling equipment, or electrical power is not available. If there is electrical power available, you can monitor the fuel quantity with the load select indicators at the fuel station (AMM 28-41-00/001). If there is no electrical power available, you can monitor the fuel quantity with the fuel measuring sticks (AMM 28-44-00/201).
- (2) When thunderstorms or lightning are within a 10 mile (16 kilometer) radius of the immediate area, the refueling procedure should stop.
- (3) Strong wind conditions can cause a build-up of static electricity. Large charges of static electricity can develop on support equipment while parked as a result of the movement of dust particles and air currents during strong wind conditions. Strong wind conditions can also cause the unwanted movement of items or equipment which can hit the airplane or injure persons. Wind gusts can damage the airplane structure. Fueling procedures should stop if strong wind conditions are present.
- (4) Fueling limits:

WARNING: DO NOT FILL THE FUEL TANKS AT A RATE MORE THAN THE FUELING RATE OF 155 GALLONS PER MINUTE (GPM). IF THE FUELING RATE IS MORE THAN 155 GPM, THE STATIC DISCHARGE CAUSED BY THE HIGH FUELING RATE COULD RESULT IN A FIRE OR AN EXPLOSION.

- (a) Do not fill the fuel tank at a rate more than the fueling rate of 155 GPM (587 LPM).
- (b) Fill the main fuel tanks with approximately equal quantities of fuel.
- (c) You can fill the fuel tanks in any sequence or at the same time.
- (d) Fuel must agree with the jet fuel specification ASTM D1655.
- (5) Drain the fuel tank sumps (AMM 12-11-03/301) before fueling such that water does not collect in the fuel.

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 20-41-00/201, Static Grounding
- (3) AMM 24-22-00/201, Electrical Power Control
- (4) AMM 28-44-00/201, Fuel Quantity Measuring Sticks

C. Access

- (1) Location Zones
 - 521 Leading Edge to Front Spar (Left)
 - 541 Main Tank - Outboard of Rib No. 10 (Left)
 - 641 Main Tank - Outboard of Rib No. 10 (Right)

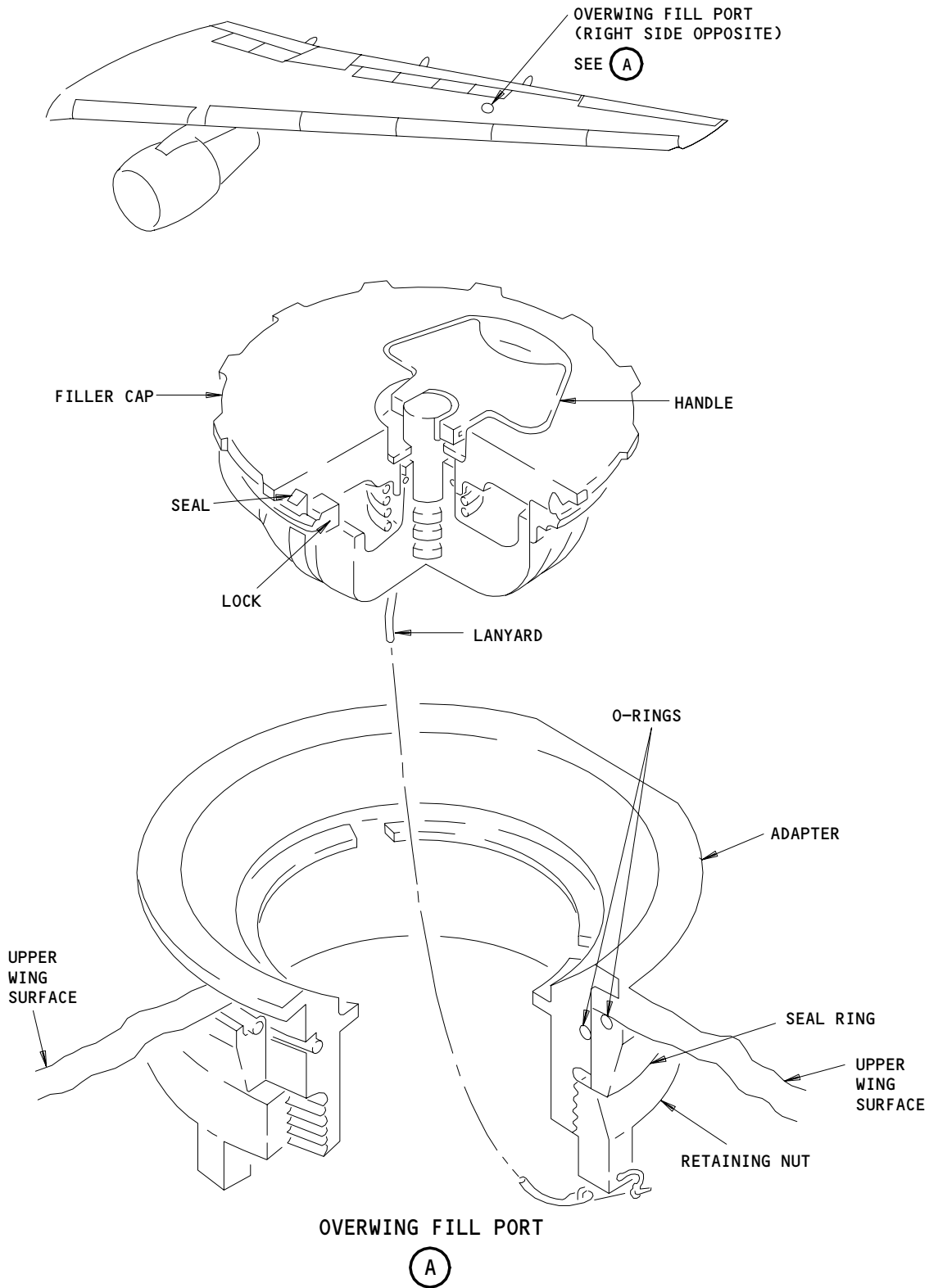
EFFECTIVITY

ALL

12-11-02

01

Page 301
Apr 22/08



OVERWING FILL PORT

(A)

Overwing Fueling
Figure 301

EFFECTIVITY	
	ALL

12-11-02

- (2) Access Panel
521QB Fueling Station Door (Left)

D. Procedure

S 913-001

WARNING: GROUND THE AIRPLANE AND THE FUELING TRUCK CORRECTLY BEFORE THE FUELING OPERATION. STATIC ELECTRICITY CAN CAUSE A FIRE OR EXPLOSION.

- (1) Ground the airplane and the fueling truck (AMM 20-41-00/201).

S 863-002

WARNING: DO NOT PUT THE GROUND EQUIPMENT UNDER THE WINGTIPS DURING THE FUELING OPERATION. THE WINGS MOVE DOWN UNDER THE WEIGHT OF FUEL AND THE WINGTIPS MOVE THE MOST. THE FUEL TANKS ARE VENTED THROUGH THE WINGTIPS WHICH CAN CAUSE A DANGEROUS AND EXPLOSIVE MIXTURE AROUND THE WINGTIP.

DO NOT OPERATE THE HF COMMUNICATION SYSTEM OR THE WEATHER RADAR DURING THE FUELING OPERATIONS.

DO NOT FILL THE FUEL TANKS AT A RATE MORE THAN THE FUELING RATE OF 155 GPM. A FUELING RATE OF MORE THAN 155 GPM CAN CAUSE AN EXPLOSIVE CONDITION.

CAUTION: DO NOT USE JET B/JP-4 FUEL WITH GENERAL ELECTRIC MODEL CF6-80C2 ENGINES WITH DRIBBLE FUEL NOZZLES, (P/N'S 9331M72P33/P34/P41 AND 1968M49/M07/M08). LOOK AT THE FUEL PANEL MARKER FOR FUEL TYPE RESTRICTION. (REF AIRWORTHINESS DIRECTIVE 2000-11-08).

DO NOT USE JET B/JP-4 FUEL WHEN OVERRIDE/JETTISON PUMPS, PN S343T002-23 AND SUBSEQUENT DASH NUMBERS, ARE INSTALLED. CHECK FUEL PANEL MARKER FOR FUEL TYPE RESTRICTIONS.

- (2) Supply electrical power if available (AMM 24-22-00/201).

S 863-029

WARNING: OBEY THE PROCEDURES FOR OPERATING THE APU DURING THE FUELING OPERATION. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (3) If the APU is operating during the refueling, do these steps:
(a) Obey the Limits for the operation of the APU, do this task: APU Starting and Operation (AMM 49-11-00/201).
(b) You can start the APU during refueling if the start is an initial start or a restart after normal shutdown.

EFFECTIVITY

ALL

12-11-02

02

Page 303
Aug 22/07

- (c) You can shut down the APU (manual or automatic) during the refueling operation.
- (d) If the low pressure indication light comes on for the APU DC fuel pump, immediately shut down the APU (AMM 49-11-00/201) so the pump will shut off. The switch for the APU DC fuel pump will not shut off the pump if the APU is operating.

S 863-030

WARNING: STOP THE REFUELING OPERATION IF THERE IS A PROTECTIVE AUTOMATIC SHUTDOWN OF THE APU OR A FAILURE TO START CONDITION. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (4) If there is a protective automatic shutdown or failure to start condition on the APU, stop the refueling operation and disconnect the fuel hose(s) from the airplane fueling adapter(s) before you start the APU again.

S 863-031

WARNING: DO THESE STEPS IF AN APU FIRES OCCURS DURING REFUELING. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (5) If an APU fire occurs, do these steps in this sequence:
 - (a) Stop the refueling operation.
 - (b) The APU should shut down automatically. If it does not shut down automatically, do this task: APU Emergency Shutdown (AMM 49-11-00/201).
 - (c) Discharge the APU fire bottles (AMM 49-11-00/201).
 - (d) Notify persons on board the airplane and Airport Fire Services.

S 863-032

WARNING: DO THESE STEPS IF A FUEL SPILLAGE OCCURS DURING REFUELING. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (6) If fuel spillage occurs, do these steps:
 - (a) Stop the refueling operation.
 - (b) Notify persons on board the airplane.
 - (c) Unload the APU and shut it down. To do this, do this task: APU Usual Shutdown (AMM 49-11-00/201).
 - 1) Do not start the APU until the spilled fuel is removed and there is no further risk of spilled fuel or vapors.

EFFECTIVITY

ALL

12-11-02

02

Page 304
Aug 22/07

S 863-033

WARNING: MAKE SURE THE FUELING VEHICLES ARE NOT PARKED IN THE EXHAUST STREAM OF THIS AIRPLANE OR ANY ADJACENT AIRPLANES. THE HOT EXHAUST CAN CAUSE A FIRE OR EXPLOSION.

- (7) Make sure fueling vehicles are in a position that avoids any risk of coming in the path of the APU exhaust stream.

NOTE: Make sure the APU exhaust stream does not impinge on fueling vehicles for other airplanes. Make sure the fueling vehicles for this airplane are out of the APU exhaust stream of adjacent airplanes.

S 863-034

- (8) Make sure the exhaust from the APU does not go into any flammable vapor zone (for example, another aircraft during fueling).

S 863-035

WARNING: MAKE SURE THE APU EXHAUST OF ADJACENT AIRCRAFT DOES NOT GO INTO A FLAMMABLE VAPOR ZONE DURING REFUELING. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (9) If an adjacent aircraft is operating its APU, make sure the APU exhaust stream does not go into a flammable vapor zone of your airplane (for example, the fuel vents or the area around the fueling station and the fueling vehicles).

S 213-036

- (10) Make sure the airplane attitude is in a 0.0 degree nose down longitudinal and 0.0 degree lateral (+/- 2.0 degree longitudinal and lateral) (AMM 08-21-00/201).
- (a) Make sure this circuit breaker on the main power distribution panel, P6, is closed:
- 1) 6E4, FUELING QTY

EFFECTIVITY

ALL

12-11-02

01

Page 305
Apr 22/08

- (b) Make sure this circuit breaker on the APU external power panel, P34, is closed:
 - 1) 34L2, FUEL QTY REFUEL
- (c) Open the fueling station door, 521QB (AMM 06-44-00/201).
- (d) Make sure the fueling panel light comes on.

NOTE: If the fueling panel light comes on it shows that electrical power is supplied to the fueling control panel.

- 1) If the fueling panel light does not come on, put the battery power switch on the fueling control panel to the BATT position.
 - a) Make sure the fueling panel light comes on.

S 983-011

- (11) If electrical power is not available, do the steps that follow:
 - (a) Use a screwdriver to push up and turn the end caps on the applicable fuel measuring stick in the counterclockwise direction.
 - (b) Lower the fuel measuring stick (AMM 28-44-00/201).

S 493-012

- (12) Put maintenance mats on the wing where the service persons must walk.

S 493-003

WARNING: DO NOT REMOVE THE FILLER CAPS BEFORE YOU GROUND THE FUELING NOZZLES. THE RELEASE OF STATIC ELECTRICITY COULD CAUSE A FIRE OR AN EXPLOSION.

- (13) Ground the fueling nozzles to the ground jacks adjacent to the overwing fill ports with grounding cables.

S 033-013

- (14) Remove the filler caps from the overwing fill ports of the main fuel tanks.

S 493-014

- (15) Put the fueling nozzles into the overwing fill ports.

S 653-004

CAUTION: OBEY THE FUELING LIMITS IN THE GENERAL PARAGRAPH. FAILURE TO OBEY THE FUELING LIMITS COULD CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (16) Start the fueling source.

EFFECTIVITY

ALL

12-11-02

06

Page 306
Dec 22/03

- S 213-005
- (17) Use the load select indicators or fuel measuring sticks as applicable, to monitor the quantities of fuel put into the fuel tank.
- S 653-015
- (18) Stop the fueling source when the set quantity of fuel is put in the fuel tanks.
- S 093-016
- (19) Remove the fuel nozzle.
- S 433-006
- (20) Install the filler caps in the overwing fill ports.
- S 093-017
- (21) Disconnect the grounding cables from the ground jacks.
- S 093-018
- (22) Remove the maintenance mats.
- S 983-019
- (23) If opened, lift and put the applicable fuel measuring sticks to the usual position.
- (a) Use a screwdriver and push up and turn the end cap on the fuel measuring stick clockwise until the fuel measuring stick is locked in the usual position (AMM 28-44-00/201).
- S 413-020
- (24) If opened, close the fueling station door, 521QB (AMM 06-44-00/201).

EFFECTIVITY

ALL

12-11-02

01

Page 307
Dec 22/03

FUEL SUMP DRAINING-SERVICING

1. General

- A. This procedure contains two tasks. The first task gets a sample of fuel at the fuel tank sump. The second task drains the fuel tank sumps.
- B. The fuel tank sumps must be drained regularly for the removal of the water from the fuel tanks. Each fuel tank sump has a drain valve that drains the water from the fuel tank. Before you sump the tank a quantity of time is necessary for the separation of water from fuel. The time rate to isolate the fuel from the water is 1 hour for each foot of fuel depth.
- C. Do not drain the sumps while you fill the airplane with fuel or immediately after you fill the airplane with fuel. The water will be mixed with the fuel. In cold weather the water can freeze. This could cause the drain valve to stay in the closed position or cause damage to the o-ring when you open the valve. It could also prevent proper re-seating of the primary or secondary poppet after you sump. For cold weather maintenance, refer to AMM 12-33-01/301.
- D. Look at each fuel sample for water, for ice, or for contamination. Water in the fuel usually shows as a layer below the fuel or as small bubbles in the fuel. The ice crystals usually shows as a cloudiness or a haziness in the fuel. Fuel with no water, ice, or contamination is clear and bright. You can easily see material through it.

NOTE: Jet-A fuel can have different colors. It can have a range of colors from yellow (straw) color to no color. The words "clear and bright" do not refer to the color of the fuel. Yellow fuel or fuel that has no color can be "clear and bright" as specified above.

NOTE: Put one or two drops of food coloring into the container before you drain a fuel sample into it. This will help you find water in the fuel, since the water will have color.

- E. A large quantity of water drained from one fuel tank before fueling can show a blocked automatic sumping jet pump. For removal of an automatic sumping jet pump, refer to AMM 28-22-06/401.
- F. When thunderstorms or lightning are within a 10 mile (16 kilometer) radius of the immediate area, the sumping procedure should stop.

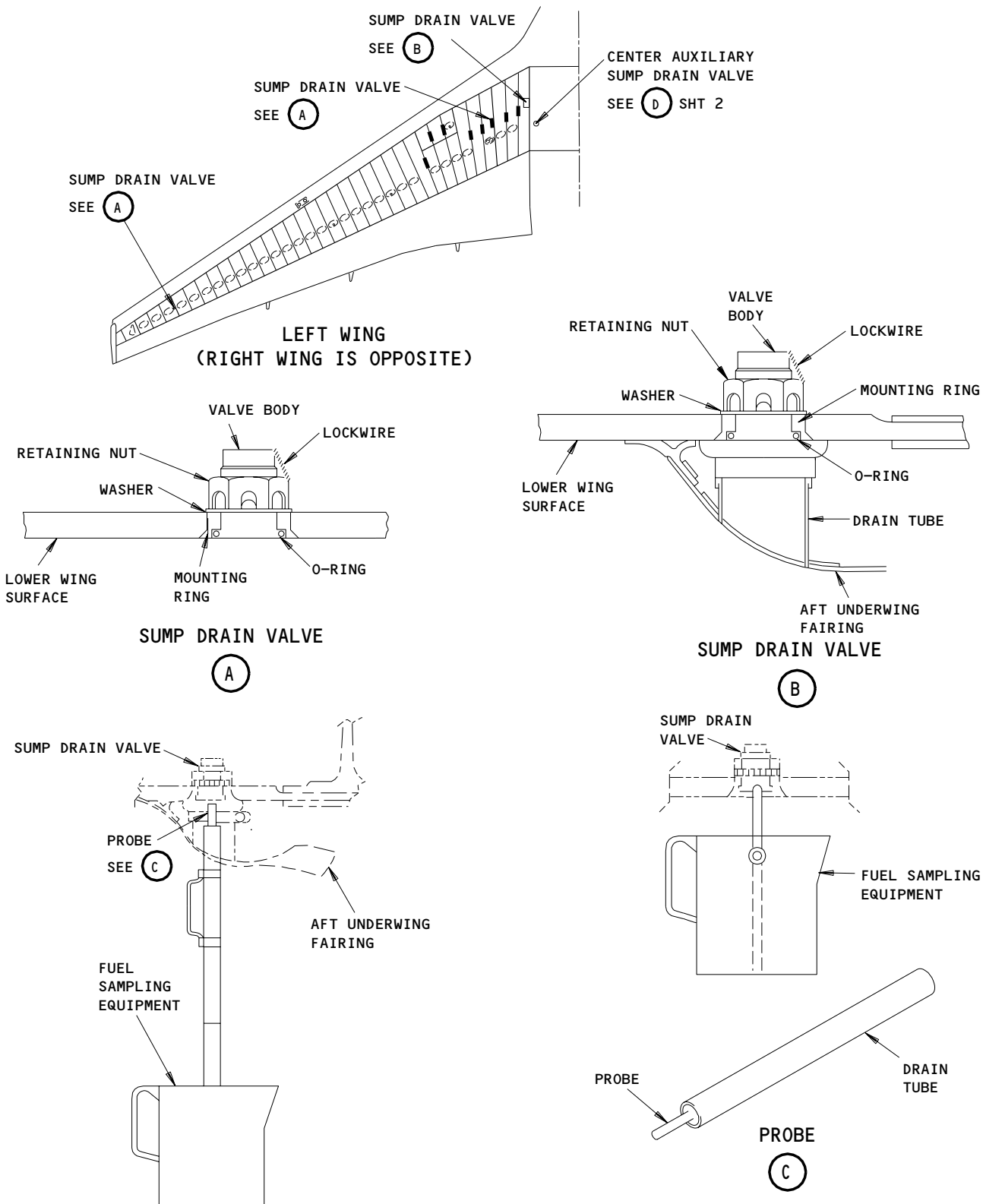
EFFECTIVITY

ALL

12-11-03

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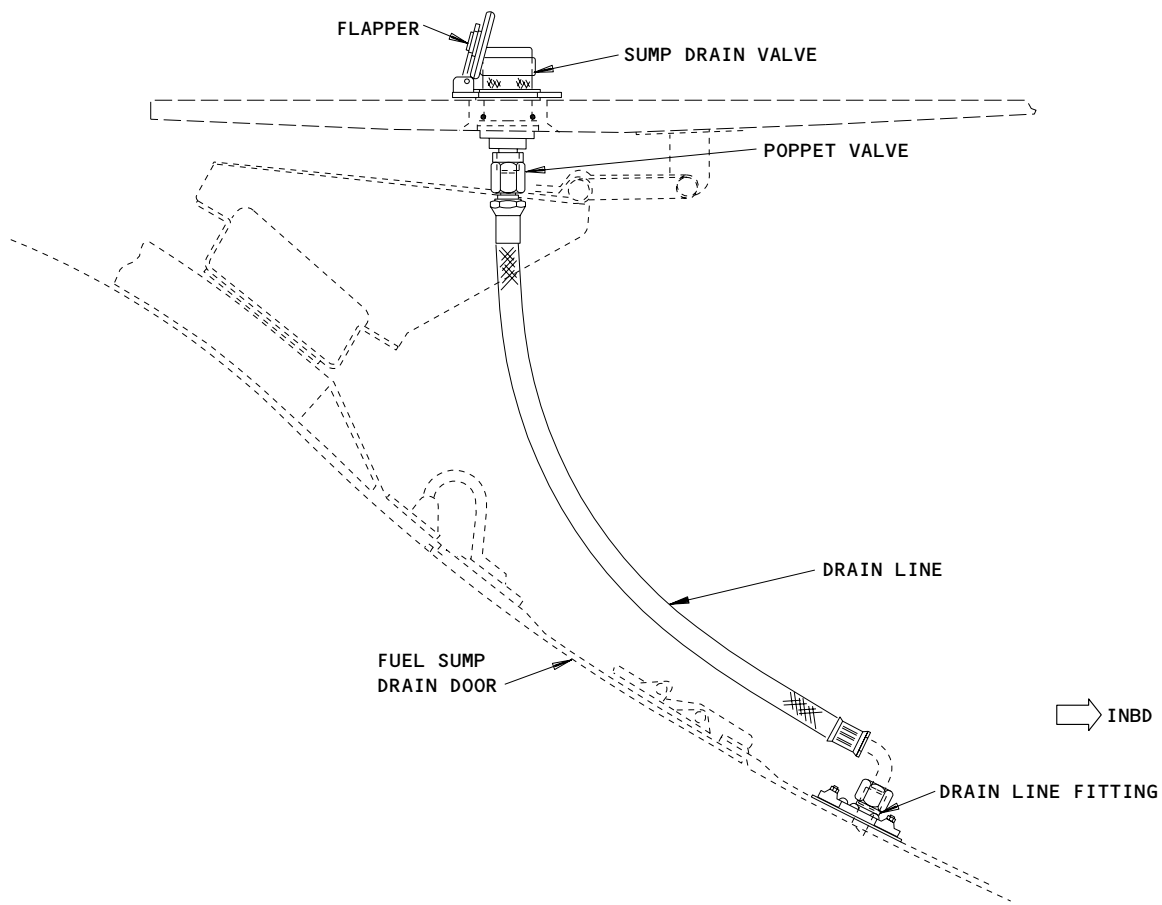
Page 301
Apr 22/08



Fuel System Sampling
Figure 301 (Sheet 1)

EFFECTIVITY	
	ALL

12-11-03



CENTER AUXILIARY
SUMP DRAIN VALVE

(D)

Fuel System Sampling
Figure 301 (Sheet 2)

EFFECTIVITY	
	ALL

12-11-03

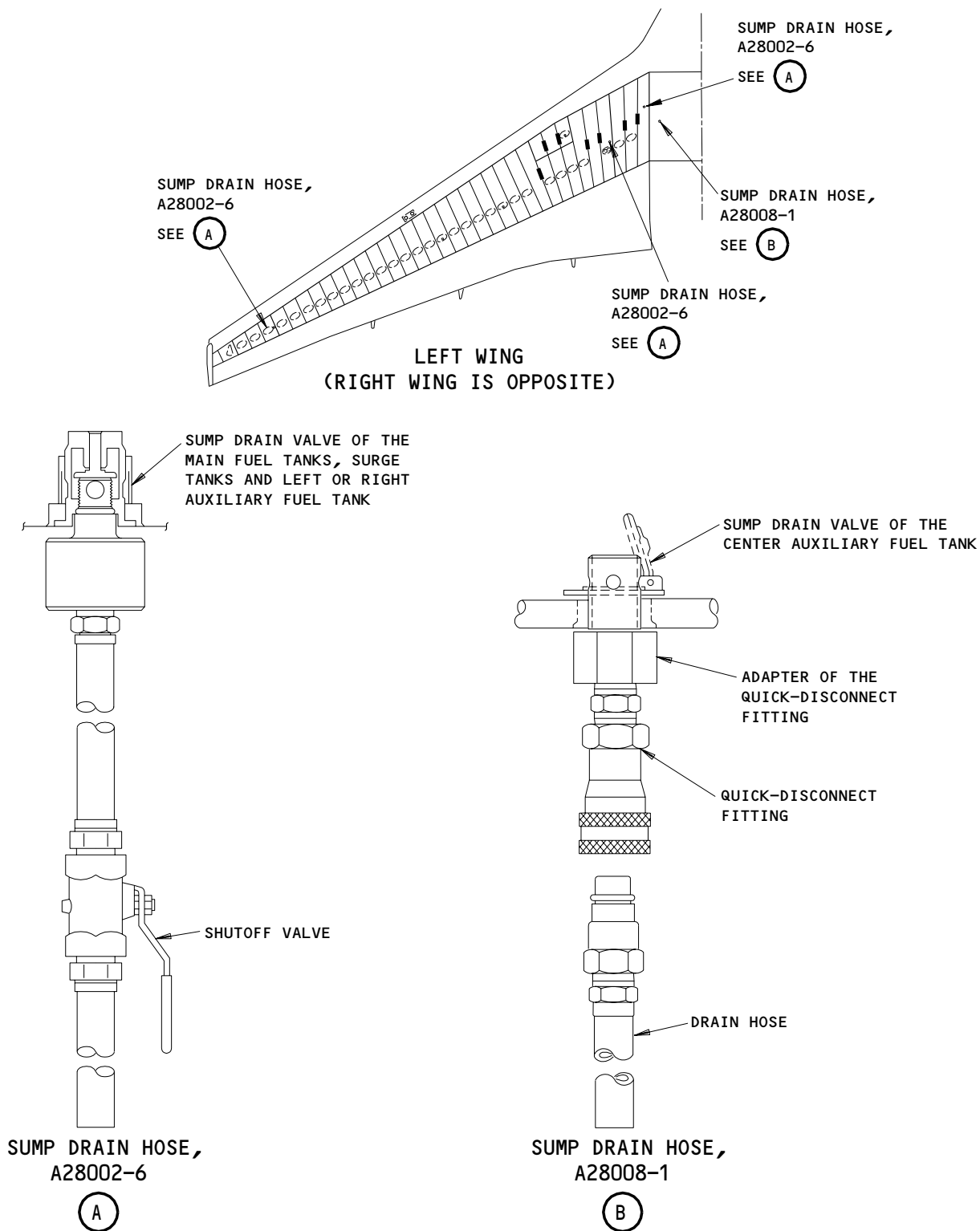
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Page 303
Aug 22/00

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BOEING

767 MAINTENANCE MANUAL



Fuel Tank Sump Draining
Figure 302

EFFECTIVITY	
	ALL

12-11-03

- G. Strong wind conditions can cause a build-up of static electricity. Large charges of static electricity can develop on support equipment while parked as a result of the movement of dust particles and air currents during strong wind conditions. Strong wind conditions can also cause the unwanted movement of items or equipment which can hit the airplane or injure persons. Wind gusts can damage the airplane structure. Sumping procedures should stop if strong wind conditions are present.

TASK 12-11-03-683-009

2. Get a Sample of Fuel at the Fuel Tank Sumps (Fig. 301)

A. General

- (1) This procedure is used to do a check for and remove water in the fuel tank before and after fueling.

B. Equipment

- (1) Fuel Sampling Equipment A12001-14
(2) Clear plastic or glass container - 1 gallon capacity

C. Consumable Materials

- (1) B00130 Alcohol - Isopropyl, to clean the equipment

D. References

- (1) AMM 06-41-00/201, Fuselage Access Panels and Doors
(2) AMM 28-10-00/201, Microbial Growth
(3) AMM 28-11-00/701, Fuel Tanks

E. Access

(1) Location Zones

- | | |
|-----|---|
| 193 | Wing to Body - Forward Lower Half (Left) |
| 194 | Wing to Body - Forward Lower Half (Right) |
| 531 | Center Auxiliary Tank (Left) |
| 532 | Main Tank - Inboard of Rib No. 10 (Left) |
| 542 | Surge Tank (Left) |
| 631 | Center Auxiliary Tank (Right) |
| 632 | Main Tank - Inboard of Rib No. 10 (Right) |
| 642 | Surge Tank (Right) |

(2) Access Panels

- | | |
|--------|------------------------------|
| 193SLX | Fuel Sump Drain Door (Left) |
| 194QRX | Fuel Sump Drain Door (Right) |

F. Procedure

S 683-010

- (1) To get a sample of fuel at the fuel tank sumps in the main fuel tanks, surge tanks and the left or right auxiliary fuel tank, do the steps that follow:
- Turn the primary poppet 90 degrees with a flat blade screwdriver to unlock the sump drain valve.
 - Put the fuel sampling equipment below the sump drain valve with the probe against the primary poppet.
 - Push the probe up against the primary poppet until fuel flows into the container.

EFFECTIVITY

ALL

12-11-03

03

Page 305
Apr 22/08

- (d) Drain each fuel tank sump (recommended minimum of approximately one quart) until the fuel that goes into the container does not contain water.
- (e) Remove the probe of the fuel sampling equipment from the primary poppet.
- (f) Make sure the sump drain valve closes without fuel leakage.
- (g) Turn the primary poppet 90 degrees to lock the sump drain valve.

S 213-033

- (2) Do a visual inspection of the fuel in the container.
 - (a) Make sure the fuel is free from contamination.

NOTE: The fuel sample should be clear and bright.

- (b) If you see water in the fuel, continue to sump the tank until you remove all of the water.
- (c) If you see red dye in the fuel, do this task: Clean the Fuel Tanks Contaminated with Red Dye (AMM 28-11-00/701).
- (d) If you see other contamination, do these steps:
 - 1) Clean the fuel sampling equipment with isopropyl alcohol and dry completely.
 - 2) With a sterilized glass container, get another sample of fuel.
 - 3) Do this task: Detection Test for Microbial Growth (AMM 28-10-00/201).

S 683-003

- (3) To get a sample of fuel at the fuel tank sumps in the center auxiliary fuel tank, do the steps that follow:
 - (a) Put an applicable container below the drain line fitting on the sump drain valve (View D).

NOTE: Use a container only. The fuel sampling equipment is not necessary.

- (b) Open the applicable left or right fuel sump drain door, 193SLX or 194QRX (AMM 06-41-00/201).
- (c) Hold the drain line near the poppet valve of the sump drain valve and push up to open the sump drain valve.
- (d) Drain each fuel tank sump until the fuel that goes into the container does not contain water.
- (e) Release the drain line to close the sump drain valve.

EFFECTIVITY

ALL

12-11-03

08

Page 306
Apr 22/08

- (f) Do a visual inspection of the fuel in the container.
 - 1) Make sure the fuel is free from contamination.

NOTE: The fuel sample should be clear and bright.

- 2) If you see water in the fuel, continue to sump the tank until you remove all of the water.
 - 3) If you see red dye in the fuel, do this task: Clean the Fuel Tanks Contaminated with Red Dye (AMM 28-11-00/701).
 - 4) If you see other contamination, do these steps:
 - a) With a sterilized glass container, get another sample of fuel.
 - b) Do this task: Detection Test for Microbial Growth (AMM 28-10-00/201).
- (g) Close the applicable fuel sump drain door, 193SLX or 194QRX (AMM 06-41-00/201).

TASK 12-11-03-653-011

3. Drain the Fuel Tank Sumps (Fig. 302)

A. General

- (1) This procedure is used to drain all fuel that remains in the fuel tank after defueling and before purging and fuel tank entry. The aircraft must be level to drain all of the remaining fuel from the tanks.

B. Equipment

- (1) Container - applicable for fuel.
- (2) Fuel System Sump Drain Hose A28002-6
- (3) Drain Hose - Sump Valve, Center Auxiliary Fuel tank:
 - (a) A28008-1
 - (b) A28008-8 (optional)

C. References

- (1) AMM 06-41-00/201, Fuselage Access Panels and Doors
- (2) AMM 08-21-00/201, Aircraft Leveling
- (3) AMM 28-11-05/401 Fuel Sump Drain Valve

D. Access

(1) Location Zones

- 193 Wing to Body - Forward Lower Half (Left)
- 194 Wing to Body - Forward Lower Half (Right)
- 531 Center Auxiliary Tank (Left)
- 532 Main Tank - Inboard of Rib No. 10 (Left)
- 542 Surge Tank (Left)
- 631 Center Auxiliary Tank (Right)
- 632 Main Tank - Inboard of Rib No. 10 (Right)
- 642 Surge Tank (Right)

(2) Access Panels

- 193SLX Fuel Sump Drain Door (Left)
- 194QRX Fuel Sump Drain Door (Right)

EFFECTIVITY

ALL

12-11-03

02

Page 307
Dec 22/04

E. Procedure

S 653-034

- (1) Adjust and maintain the airplane attitude at 0.0 degree nose down (+/- 0.1 degree) longitudinal and 0.0 degree (+/- 0.1 degree) lateral (AMM 08-21-00/201).

S 653-012

- (2) To drain the fuel tank sumps in the main fuel tanks, surge tanks, and the left or right auxiliary fuel tank (View A), do the steps that follow:
- (a) Remove the primary poppet of the sump drain valve (AMM 28-11-05/401).
 - (b) Close the shutoff valve on the sump drain hose.
 - (c) Install the sump drain hose in the sump drain valve.
 - (d) If it is necessary, install an extension hose or suitable drain connection to the sump drain hose.
 - (e) Open the shutoff valve on the sump drain hose.
 - (f) Drain the fuel into a suitable container.
 - (g) After you drain the fuel, close the shutoff valve.
 - (h) Remove the extension hose or drain connection, if installed.
 - (i) Remove the sump drain hose.
 - (j) Install the primary poppet in the sump drain valve (AMM 28-11-05/401).

S 653-008

- (3) To drain the fuel tank sumps in the center auxiliary fuel tank (View D), do the steps that follow:
- (a) Open the applicable left or right fuel sump drain door, 193SLX or 194QRX (AMM 06-41-00/201).
 - (b) Disconnect the drain line at the poppet valve of the sump drain valve.
 - (c) Remove the sump drain valve (AMM 28-11-05/401).
 - (d) Install the adapter end of the quick-disconnect fitting of the sump valve drain hose in the fuel tank sump (View B, Fig. 302).
 - (e) Connect the drain hose to the quick-disconnect fitting.
 - (f) Drain the fuel into an applicable container.
 - (g) After you drain all the fuel, remove the drain hose.
 - (h) Remove the quick-disconnect fitting.
 - (i) Install the sump drain valve (AMM 28-11-05/401).
 - (j) Connect the drain line at the poppet valve of the sump drain line.
 - (k) Close the applicable fuel sump drain door, 193SLX or 194QRX (AMM 06-41-00/201).

EFFECTIVITY

ALL

12-11-03

08

Page 308
Apr 22/08

HYDRAULIC SYSTEMS – SERVICING

1. General

A. This procedure has these tasks:

- (1) Do a check of the fluid level in the hydraulic reservoirs.
- (2) Fill the hydraulic reservoirs with the manual procedure.
- (3) Fill the hydraulic reservoirs with the pressure procedure.

NOTE: To get the correct fluid level in the reservoirs, you must fill the reservoirs in these conditions:

- all landing gear in the down position
- all landing gear doors closed
- the steering and flight controls in the neutral position.

When you fill the reservoir in the right system, the pressure gage for the brake accumulator must show a minimum of 2500 psi.

B. There are two sight gages on each hydraulic reservoir. If you can not see the fluid at the bottom sight glass, the fluid level is too low. If you can see the fluid at the top sight glass, the fluid level is too high.

TASK 12-12-01-703-062

2. Fluid Level Check for the Hydraulic Reservoirs

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-43-00/201, Engine and Nacelle Strut Access Doors and Panels
- (3) AMM 24-22-00/201, Electrical Power – Control
- (4) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (5) AMM 32-00-20/201, Landing Gear Downlocks
- (6) AMM 78-31-00/201, Thrust Reverser System

B. Access

(1) Location Zones

144	Right MLG Wheel Well
198	Wing to Body – Aft Lower Half (Right)
211/212	Control Cabin
437/447	Aft Nacelle Strut Fairing

EFFECTIVITY

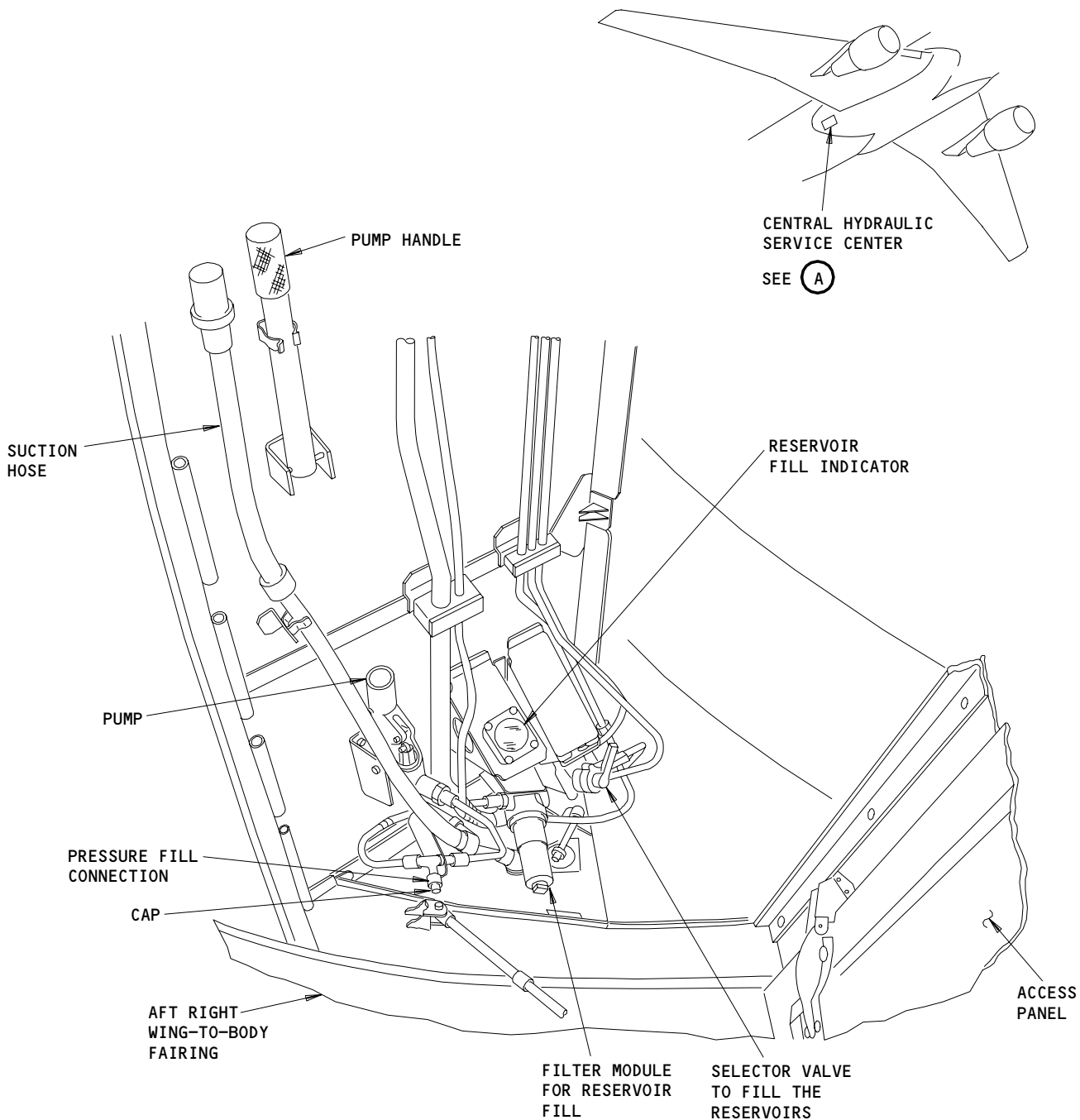
ALL

12-12-01

01

Page 301
Apr 22/08

BOEING
767
MAINTENANCE MANUAL



CENTRAL HYDRAULIC SERVICE CENTER

(A)

Central Hydraulic Service Center
Figure 301

EFFECTIVITY	
	ALL

12-12-01

01

Page 302
Feb 10/91

34528

- (2) Access Panels
 - 198CR Central Hydraulic Service Center
 - 437BL/437BR Hydraulic System
 - 447BL/447BR Hydraulic System

C. Procedure (Fig. 301)

S 863-001

- (1) Supply electrical power (AMM 24-22-00/201).

S 013-002

- (2) Open the access panel, 198CR, for the central hydraulic service center (AMM 06-41-00/201).

S 863-003

- (3) Put the reservoir fill valve to the position (L, R, or C) for the hydraulic system on which you will do the check.

S 493-004

- (4) For the right hydraulic system, make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 703-063

WARNING: HYDRAULIC FLUID, BMS 3-11, CAN CAUSE INJURY TO PERSONS. IF YOU GET THE HYDRAULIC FLUID ON YOUR SKIN, FLUSH YOUR SKIN WITH WATER. IF YOU GET THE HYDRAULIC FLUID IN YOUR EYES, FLUSH YOUR EYES WITH WATER AND GET MEDICAL AID. IF YOU EAT OR DRINK THE HYDRAULIC FLUID, GET MEDICAL AID.

- (5) Do these steps before you do a check of the fluid level in the right hydraulic system:
 - (a) Make sure the pressure gage on the brake accumulator, in the right main landing gear wheel well shows a minimum of 2500 psi.

CAUTION: YOU MUST HAVE FLUID IN THE RIGHT SYSTEM RESERVOIR, BEFORE YOU OPERATE THE HYDRAULIC PUMPS OR YOU MUST PRESSURIZE THE RIGHT SYSTEM WITH A HYDRAULIC SERVICE CART. IF YOU OPERATE THE HYDRAULIC PUMPS WITHOUT SUFFICIENT FLUID IN THE RESERVOIR, YOU CAN CAUSE DAMAGE TO THE PUMPS.

- (b) If the pressure gage does not show a minimum of 2500 psi, pressurize the right hydraulic system (AMM 29-11-00/201).

EFFECTIVITY

ALL

12-12-01

01

Page 303
Dec 22/00

- (c) Remove hydraulic power, after the right hydraulic system pressurizes the brake accumulator to a minimum of 2500 psi (AMM 29-11-00/201).
- (d) Parking brake released with wheel chocks installed (AMM 10-11-01/201).

NOTE: You can set the parking brake for servicing but the reservoir quantity can change when the parking brake is released.

S 863-007

- (6) Make sure the six EICAS circuit breakers on the overhead panel, P11, are closed.

S 863-009

- (7) Push the ELEC/HYD switch on the EICAS MAINT panel, on the right side panel, P61.

S 213-010

- (8) Make sure the OF or the RF indication does not show on the display adjacent to the (L, C, R) HYD QTY indication.

S 213-011

- (9) Make sure the reservoir fill indicator, at the central hydraulic service center, is at the FULL mark.

S 683-012

- (10) If the display or the reservoir fill indicator shows that a reservoir is too full, lower the fluid level as follows:

WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (a) For the left or right hydraulic system, do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).
- (b) For the left hydraulic system, open the access panels, 437BL and 437BR (AMM 06-43-00/201).
- (c) For the right hydraulic system, open the access panels, 447BL and 447BR (AMM 06-43-00/201).

EFFECTIVITY

ALL

12-12-01

01

Page 304
Dec 22/01

- (d) For the center hydraulic system, make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).
- (e) Remove the pressure from the applicable hydraulic system and the reservoir (AMM 29-11-00/201).
- (f) Open the drain valve on the applicable hydraulic reservoir.
- (g) Drain the hydraulic fluid into a container.
- (h) Close the reservoir drain valve when the reservoir fill indicator is at the FULL mark.
- (i) Safety the drain valve, on the reservoir, with a lockwire.
- (j) For the left hydraulic system, close the access panels, 437BL and 437BR (AMM 06-43-00/201).
- (k) For the right hydraulic system, close the access panels, 447BL and 447BR (AMM 06-43-00/201).
- (l) For the left or right hydraulic system, do the activation procedure for the thrust reverser (AMM 78-31-00/201).

S 613-013

- (11) If the EICAS display or the reservoir fill indicator shows that the reservoir is not full, increase the fluid level with one of these procedures:
 - (a) Fill the Hydraulic Reservoir with the Manual Procedure
 - (b) Fill the Hydraulic Reservoir with the Pressure Procedure.

S 863-014

- (12) Put the reservoir fill valve to the CLOSED position.

S 413-015

- (13) Close the access panel, 198CR, for the central hydraulic service center (AMM 06-41-00/201).

S 863-017

- (14) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

TASK 12-12-01-613-059

3. Fill the Hydraulic Reservoir - Manual Procedure

A. Consumable Materials

- (1) D00153 Hydraulic Fluid, Fire-Resistant -
BMS 3-11

EFFECTIVITY

ALL

12-12-01

01

Page 305
Feb 10/96

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

(1) Location Zones

- 144 Right MLG Wheel Well
- 198 Wing to Body - Aft Lower Half (Right)
- 211/212 Control Cabin

(2) Access Panels

- 198CR Central Hydraulic Service Center

D. Procedure (Fig. 301)

S 863-018

- (1) Supply electrical power (AMM 24-22-00/201).

S 493-019

- (2) For the right hydraulic system, make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 863-021

- (3) Do these steps before you do a check of the fluid level in the right hydraulic system:
 - (a) Make sure the pressure gage on the brake accumulator, in the right main landing gear wheel well shows a minimum of 2500 psi.

CAUTION: YOU MUST HAVE FLUID IN THE RIGHT SYSTEM RESERVOIR, BEFORE YOU OPERATE THE HYDRAULIC PUMPS OR YOU MUST PRESSURIZE THE RIGHT SYSTEM WITH A HYDRAULIC SERVICE CART. IF YOU OPERATE THE HYDRAULIC PUMPS WITHOUT SUFFICIENT FLUID IN THE RESERVOIR, YOU CAN CAUSE DAMAGE TO THE PUMPS.

- (b) If the pressure gage does not show a minimum of 2500 psi, pressurize the right hydraulic system (AMM 29-11-00/201) and allow the brake accumulator to pressurize to a minimum of 2500 psi.

EFFECTIVITY

ALL

12-12-01

01

Page 306
Dec 22/00

(c) Remove hydraulic power (AMM 29-11-00/201).

S 013-022

(4) Open the access panel, 198CR, for the central hydraulic service center (AMM 06-41-00/201).

S 023-023

CAUTION: USE CLEAN HYDRAULIC FLUID, BMS 3-11, AND CLEAN EQUIPMENT TO FILL THE HYDRAULIC SYSTEM RESERVOIRS. IF YOU DO NOT USE CLEAN HYDRAULIC FLUID AND EQUIPMENT, CONTAMINATION OF THE HYDRAULIC SYSTEM CAN OCCUR.

(5) Remove the suction hose from the stowage tube.

S 163-024

(6) Clean the suction hose with a rag.

S 613-025

(7) Put the end of the suction hose in a container of hydraulic fluid.

NOTE: All currently qualified BMS 3-11, Type IV and Type V hydraulic fluids are interchangeable and intermixable in any proportion (767-SL-29-045).

S 023-026

(8) Remove the pump handle from the brackets.

S 423-027

(9) Put the pump handle in the socket of the manual fill pump.

S 613-028

WARNING: BE CAREFUL TO NOT FILL THE RESERVOIR TO MORE THAN THE NECESSARY LEVEL. IF YOU PUT TOO MUCH FLUID IN THE RESERVOIRS, THE FLUID CAN GO INTO THE DUCTS OF THE PNEUMATIC SYSTEM AND THE AIR CONDITIONING PACKS. THIS CAN CAUSE SMOKE AND DANGEROUS FUMES TO GO INTO THE FLIGHT COMPARTMENT AND THE MAIN DECK. IF CONTAMINATION OF THE PNEUMATIC SYSTEM OCCURS AGAIN AND AGAIN, IT CAN CAUSE DAMAGE TO THE TITANIUM DUCTS.

(10) Do these steps for each hydraulic reservoir you will fill:

(a) Put the reservoir fill valve to the position (L,R, or C) for the hydraulic system in which you will fill the reservoir.

EFFECTIVITY

ALL

12-12-01

01

Page 307
Apr 22/05

- (b) Operate the manual fill pump to fill the reservoir.
- (c) Monitor the reservoir fill indicator, at the central hydraulic service center, while you fill the reservoir.
- (d) Stop when the reservoir fill indicator is at the FULL mark.
- (e) Make sure the six EICAS circuit breakers on the overhead panel, P11, are closed.
- (f) Push the ELEC/HYD switch on the EICAS MAINT panel, on the right side panel, P61.
- (g) Make sure the (L,R, or C) HYD QTY indication on the display shows 0.90 to 1.10.

S 613-029

- (11) If you fill a hydraulic reservoir after the replacement of a component or when there is no hydraulic fluid in the system, do these steps:
 - (a) Pressurize the applicable hydraulic system (AMM 29-11-00/201).
 - (b) Operate all the flight control surfaces through three full cycles.
 - (c) Remove hydraulic power (AMM 29-11-00/201).
 - (d) Do the steps to fill the hydraulic reservoir again.

S 863-030

- (12) Put the reservoir fill valve in the OFF position.

S 023-031

- (13) Remove the pump handle from the socket of the manual fill pump.

S 423-032

- (14) Put the pump handle in the brackets.

S 613-033

- (15) Remove the suction hose from the container of hydraulic fluid.

S 683-034

- (16) Drain the hydraulic fluid from the suction hose.

EFFECTIVITY

ALL

12-12-01

01

Page 308
Apr 22/01

S 163-035

- (17) Remove the hydraulic fluid from the suction hose with a rag.

S 423-036

- (18) Put the suction hose into the stowage tube.

S 413-037

- (19) Close the access panel, 198CR, for the central hydraulic service center (AMM 06-41-00/201).

S 863-039

- (20) If the reserve brakes and steering system operated because of a low fluid level in the center system reservoir, do these steps to put the system back to its usual condition:
- (a) Put the RESERVE BKS & STRG switch on the pilots' center instrument panel, P1, to the off position.
 - (b) Make sure the VALVE switch light comes on while the isolated ACMP shutoff valves move.
 - (c) Make sure the VALVE switch light goes off when the isolated ACMP shutoff valves stop.
 - (d) Put the RESERVE BRAKES & STRG switch on the right side panel, P61, to the RESET/DISABLE position and then to the NORM position.
 - (e) Make sure the ISLN light on the P61 panel goes off.

S 863-040

- (21) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 12-12-01-613-060

4. Fill the Hydraulic Reservoir - Pressure Procedure

A. Equipment

- (1) Hydraulic Ground Service Cart, with Hydraulic Fluid, Fire-Resistant - BMS 3-11

B. Consumable Materials

- (1) D00153 Hydraulic Fluid, Fire Resistant - BMS 3-11

EFFECTIVITY

ALL

12-12-01

02

Page 309
Feb 10/96

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (4) AMM 32-00-20/201, Landing Gear Downlocks

D. Access

(1) Location Zones

- 144 Right MLG Wheel Well
- 198 Wing to Body - Aft Lower Half (Right)
- 211/212 Control Cabin

(2) Access Panels

- 198CR Central Hydraulic Service Center

E. Procedure (Fig. 301)

S 863-041

- (1) Supply electrical power (AMM 24-22-00/201).

S 493-042

- (2) For the right hydraulic system, make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 863-044

- (3) Do these steps before you do a check of the fluid level in the right hydraulic system:
 - (a) Make sure the pressure gage on the brake accumulator, in the right wheel well, shows a minimum of 2500 psi.

CAUTION: YOU MUST HAVE FLUID IN THE RIGHT SYSTEM RESERVOIR, BEFORE YOU OPERATE THE HYDRAULIC PUMPS OR YOU MUST PRESSURIZE THE RIGHT SYSTEM WITH A HYDRAULIC SERVICE CART. IF YOU OPERATE THE HYDRAULIC PUMPS WITHOUT SUFFICIENT FLUID IN THE RESERVOIR, YOU CAN CAUSE DAMAGE TO THE PUMPS.

- (b) If the pressure gage does not show a minimum of 2500 psi, pressurize the right hydraulic system (AMM 29-11-00/201) and allow the brake accumulator to pressurize to a minimum of 2500 psi.

EFFECTIVITY

ALL

12-12-01

02

Page 310
Dec 22/03

(c) Remove hydraulic power (AMM 29-11-00/201).

S 013-045

(4) Open the access panel, 198CR, for the central hydraulic service center (AMM 06-41-00/201).

S 033-046

CAUTION: USE CLEAN HYDRAULIC FLUID, BMS 3-11, AND CLEAN EQUIPMENT TO FILL THE HYDRAULIC SYSTEM RESERVOIRS. IF YOU DO NOT USE CLEAN HYDRAULIC FLUID AND EQUIPMENT, CONTAMINATION OF THE HYDRAULIC SYSTEM CAN OCCUR.

(5) Remove the cap from the pressure fill connection.

NOTE: All currently qualified BMS 3-11, Type IV hydraulic fluids are interchangeable and intermixable in any proportion.

S 493-047

(6) Connect the hydraulic service cart to the pressure fill connection.

S 613-061

WARNING: BE CAREFUL TO NOT FILL THE RESERVOIR TO MORE THAN THE NECESSARY LEVEL. IF YOU PUT TOO MUCH FLUID IN THE RESERVOIRS, THE FLUID CAN GO INTO THE DUCTS OF THE PNEUMATIC SYSTEM AND THE AIR CONDITIONING PACKS. THIS CAN CAUSE SMOKE AND DANGEROUS FUMES TO GO INTO THE FLIGHT COMPARTMENT AND THE MAIN DECK. IF CONTAMINATION OF THE PNEUMATIC SYSTEM OCCURS AGAIN AND AGAIN, IT CAN CAUSE DAMAGE TO THE TITANIUM DUCTS.

(7) Do these steps for each hydraulic reservoir you will fill:
(a) Put the reservoir fill valve to the position (L,R, or C) for the hydraulic system in which you will fill the reservoir.

CAUTION: USE A MAXIMUM OF 150 PSI WHEN YOU FILL THE HYDRAULIC RESERVOIR. TOO MUCH PRESSURE CAN CAUSE DAMAGE TO THE HYDRAULIC RESERVOIR.

(b) Operate the hydraulic service cart.

EFFECTIVITY

ALL

12-12-01

01

Page 311
Aug 22/99

- (c) Monitor the reservoir fill indicator, at the central hydraulic service center, while you fill the reservoir.
- (d) Stop when the reservoir fill indicator is at the FULL mark.
- (e) Make sure the six EICAS circuit breakers on the overhead panel, P11, are closed.
- (f) Push the ELEC/HYD switch on the EICAS MAINT panel, on the right side panel, P61.
- (g) Make sure the (L,R, or C) HYD QTY indication on the display shows 0.90 to 1.10.

S 613-049

- (8) If you fill a hydraulic reservoir after the replacement of a component or when there is no hydraulic fluid in the system, do these steps:
 - (a) Pressurize the applicable hydraulic system (AMM 29-11-00/201).
 - (b) Operate all the flight control surfaces through three full cycles.
 - (c) Remove hydraulic power (AMM 29-11-00/201).
 - (d) Do the steps to fill the hydraulic reservoir again.

S 863-050

- (9) Put the reservoir fill valve to the OFF position.

S 613-051

- (10) Stop the hydraulic service cart.

S 093-052

- (11) Disconnect the hydraulic service cart from the pressure fill connection.

S 433-053

- (12) Install a cap on the pressure fill connection.

S 413-054

- (13) Close the access panel, 198CR, for the central hydraulic service center (AMM 06-41-00/201).

EFFECTIVITY

ALL

12-12-01

01

Page 312
Apr 22/01

S 863-056

- (14) If the reserve brakes and steering system operated because of a low fluid level in the center system reservoir, do these steps to put the system back to its usual condition:
- (a) Put the RESERVE BKS & STRG switch on the pilots' center instrument panel, P1, to the off position.
 - (b) Make sure the VALVE switch light comes on while the isolated ACMP shutoff valves move.
 - (c) Make sure the VALVE switch light goes off when the isolated ACMP shutoff valves stop.
 - (d) Put the RESERVE BRAKES & STRG switch on the right side panel, P61, to the RESET/DISABLE position and then to the NORM position.
 - (e) Make sure the ISLN light on the P61 panel goes off.

S 863-057

- (15) Remove electrical power if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY

ALL

12-12-01

02

Page 313
Feb 10/96

NOSE RADOME SNUBBER – SERVICING

1. General

- A. This procedure contains one task. The task is to bleed the nose radome snubbers.

TASK 12-12-03-873-013

2. Bleed the Nose Radome Snubber

A. General

- (1) The servicing of the top and bottom nose radome snubbers are the same.

B. Equipment

- (1) Hydraulic pressure source charged with MIL-H-5606 hydraulic fluid, with 95 ±5 psi, fitted with male fitting threaded 7/16-20UNF-3A

C. Consumable Material

- (1) D00070 Oil-Hydraulic MIL-H-5606 Petroleum Base

D. References

- (1) AMM 53-12-01/201, Nose Radome

E. Access

- (1) Location Zone
111 Radome

F. Procedure

S 013-002

- (1) Open the nose radome (AMM 53-12-01/201).

S 033-001

- (2) Remove the fill plug and the gasket from the snubber (Fig. 301).

S 423-003

WARNING: DO NOT USE MORE THAN 100 PSI WHEN YOU FILL THE SNUBBER WITH HYDRAULIC FLUID. TOO MUCH PRESSURE CAN CAUSE DAMAGE TO THE SNUBBER AND INJURY TO PERSONS.

- (3) Connect the hydraulic pressure source.

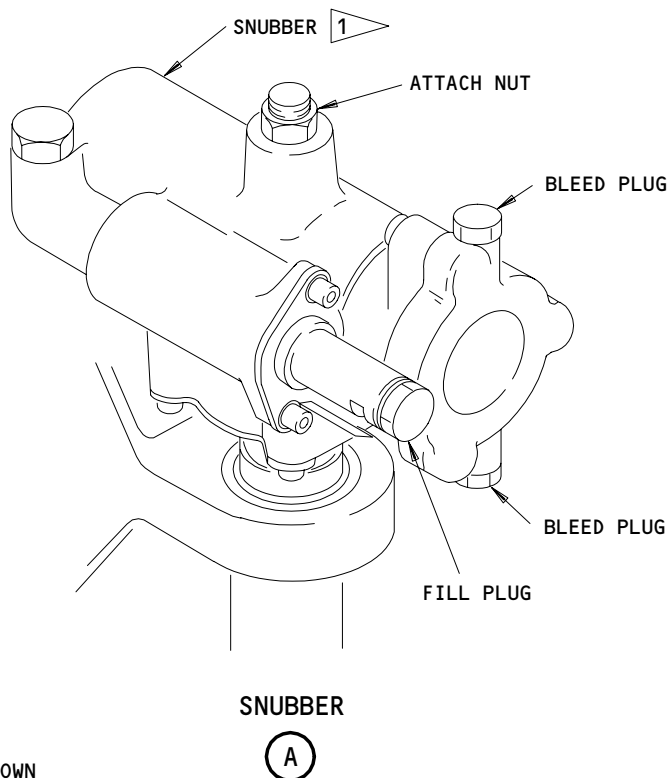
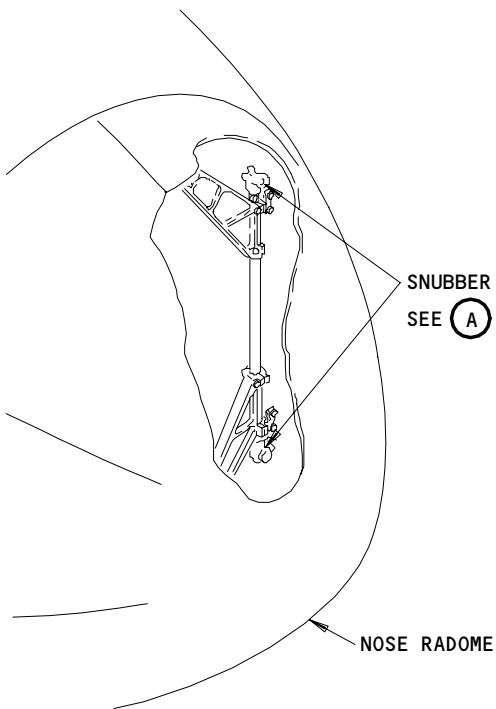
EFFECTIVITY

ALL

12-12-03

01

Page 301
Apr 22/99



1 THE UPPER SNUBBER IS SHOWN
(THE LOWER SNUBBER IS THE SAME)

Nose Radome Snubber Servicing
Figure 301

EFFECTIVITY	
	ALL

12-12-03

01

Page 302
Apr 22/99

- S 873-014
- (4) Fill the snubber with the hydraulic fluid until the piston shaft is fully extended.
- S 033-012
- (5) Loosen the two bleed plugs while pressure is applied.
- S 873-011
- (6) Turn the nose radome from the fully open to the fully closed position three times. This will remove the air from the snubber.
- S 433-010
- (7) Close the bleed plugs.
- S 873-009
- (8) Decrease the hydraulic pressure source to zero.
- S 873-008
- (9) Lightly open one bleed plug and let the piston shaft retract 0.07 inch.
- S 433-007
- (10) Tighten the bleed plug.
- S 023-006
- (11) Remove the hydraulic pressure source.
- S 433-005
- (12) Install the fill plug and the gasket in the snubber.
- S 413-004
- (13) Close the nose radome (AMM 53-12-01/201).

EFFECTIVITY

ALL

12-12-03

01

Page 303
Apr 22/99

ENGINE - OIL SERVICING

1. General

- A. This procedure includes two tasks to fill the engine oil tank. The first task is for the engines that have not incorporated PW Service Bulletins 79-47 and 79-65 (engines with the cutaway oil tank end). The second task is for the engines that have incorporated PW Service Bulletins 79-47 and 79-65.
- B. Refer to PW SB 238 for information on approved oil brands, oil types, and instructions for changeover to a different brand or type of oil.
- C. ENGINES PRE-PW-SB 79-47;
The oil tank have a filler neck connector between the oil tank boss and the filler neck valve.
- D. ENGINES POST-PW-SB 79-47 AND POST-PW-79-65;
(ENGINES WITH THE CUTAWAY OIL TANK END);
The oil tanks do not have a filler neck connector.
- E. You can get access to the oil tank cap through the oil access door on the left core cowl panel.

TASK 12-13-01-613-001

2. Engine Oil Servicing (Fig. 301)

- A. Equipment
 - (1) Adapter - PWA 86018, Oil Sampler (Optional)
 - (2) Container - 5 U.S. gallons (19 liters) for oil
- B. Consumable Materials
 - (1) D00390 Oil - Engine
 - (2) D00137 Oil - Aircraft Turbine Engine, Synthetic Base, PWA 521 (P03-001)
- C. References
 - (1) AMM 71-00-00/201, Power Plant
 - (2) AMM 78-31-00/201, Thrust Reverser System
 - (3) AMM 79-11-03/201, Engine Oil Tank Cap
 - (4) AMM 79-21-10/401, Magnetic Chip Detectors
- D. Access
 - (1) Location Zones
 - 417 L Power Plant Core Cowl
 - 427 R Power Plant Core Cowl
 - (2) Access Panels
 - 417AL Core Cowl (Left)
 - 427AL Core Cowl (Left)
- E. Prepare for Engine Oil Servicing

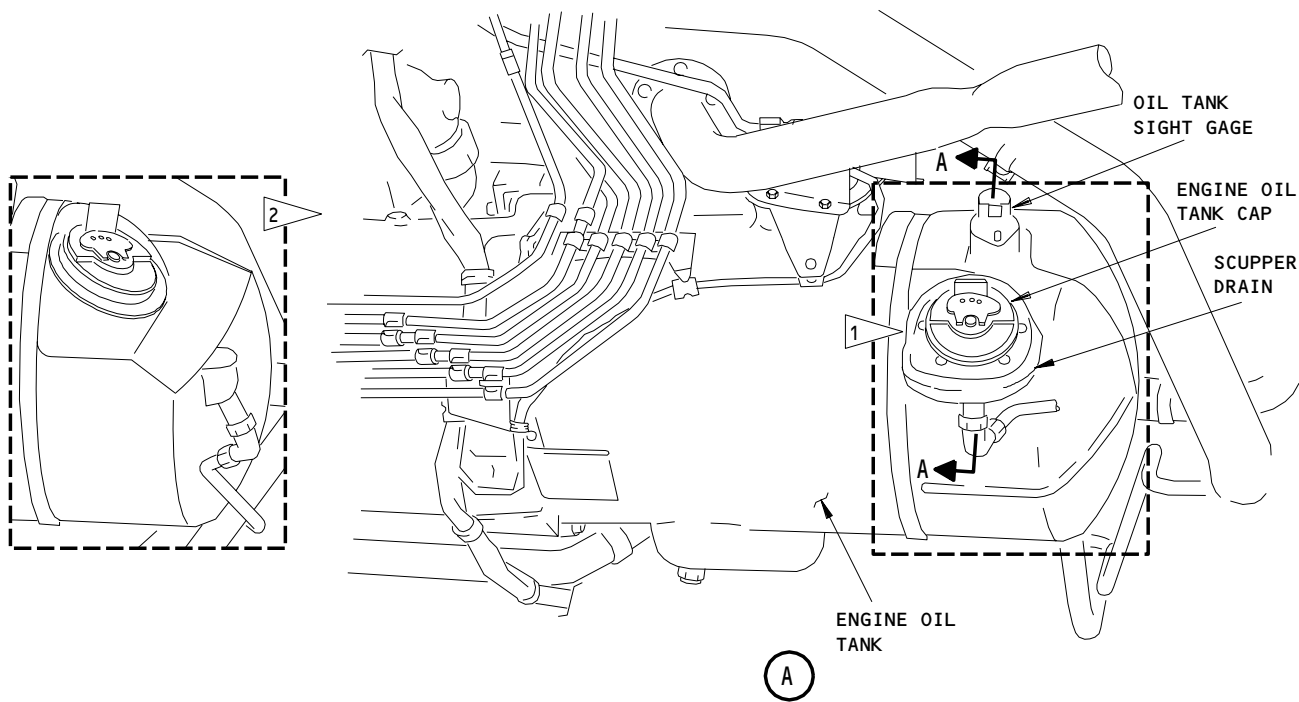
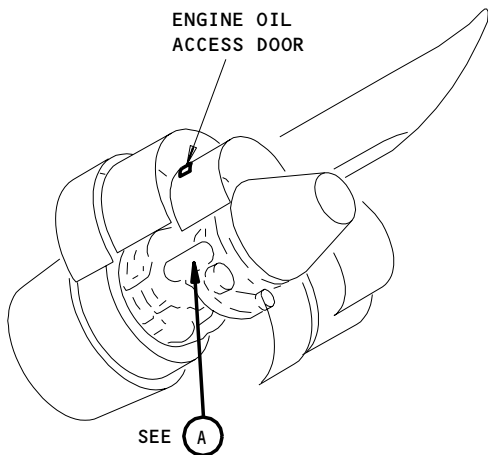
EFFECTIVITY

ALL

12-13-01

01C

Page 301
Apr 22/06



- 1 ▽ ENGINES PRE-PW-SB 79-65
- 2 ▽ ENGINES POST-PW-SB 79-65

Engine Oil Servicing
Figure 301 (Sheet 1)

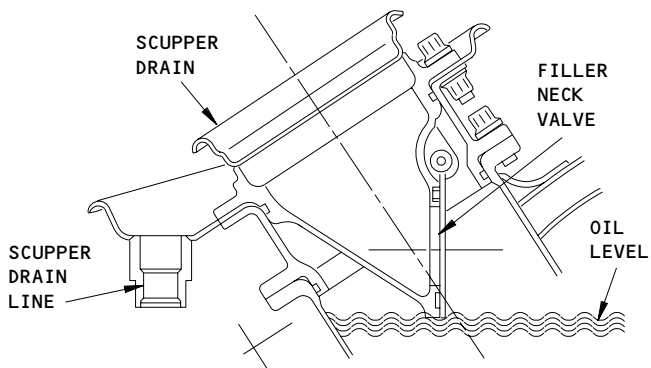
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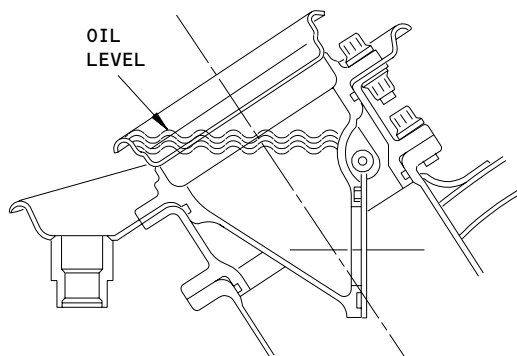
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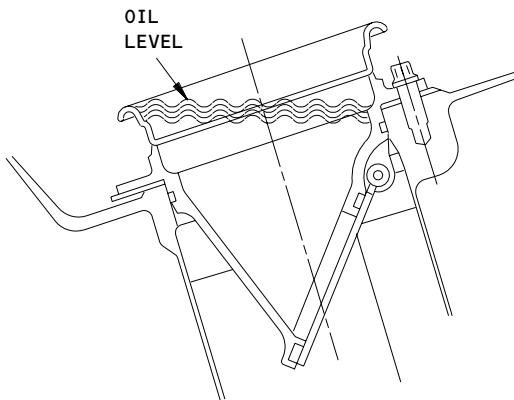
Page 302
Aug 22/00



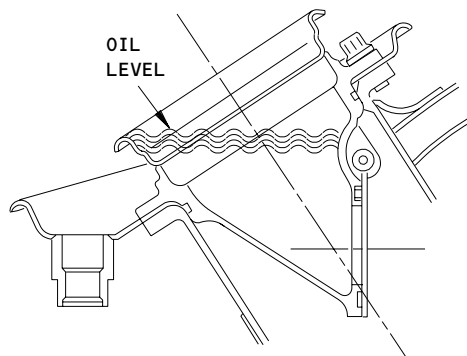
MAXIMUM FILL LEVEL ON ENGINES
PRE-PW-SB 79-47
(LEFT ENGINE)
A-A



MAXIMUM FILL LEVEL ON ENGINES
PRE-PW-SB 79-47
(RIGHT ENGINE)
A-A



MAXIMUM FILL LEVEL ON ENGINES
POST-PW-SB 79-65
A-A



MAXIMUM FILL LEVEL ON ENGINES
POST-PW-SB 79-47
A-A

L-A6593 (0893)

Engine Oil Servicing
Figure 301 (Sheet 2)

EFFECTIVITY	ALL
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12-13-01

02C

Page 303
Aug 22/00

E38563

S 213-002

CAUTION: YOU MUST OBEY THE TIME LIMITS IN THE STEPS THAT FOLLOW WHEN YOU FILL THE ENGINE WITH ENGINE OIL. A FAILURE TO DO THIS CAN CAUSE AN INCORRECT SERVICING OF THE ENGINE OIL TANK AND DAMAGE TO THE ENGINE.

(1) Examine the oil level.

NOTE: You must fill the engine oil tank from (15) fifteen minutes to two (2) hours after the engine is shut down.

NOTE: If you see "black oil" in the oil system, refer to AMM 72-00-00/601. Black oil can be an indication of a serious problem or it can be a condition that requires no maintenance action.

S 863-003

(2) If the engine was stopped for more than two (2) hours, dry motor the engine for approximately two (2) minutes (AMM 71-00-00/201).

NOTE: Do this until the oil quantity is stable.

S 863-004

(3) After the dry motor procedure is done, do the steps that follow:
(a) Wait for a minimum of fifteen (15) minutes but not more than two (2) hours before servicing engine oil system.

S 043-006

WARNING: DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO YOU OR DAMAGE TO EQUIPMENT.

(4) Do the deactivation procedure for the thrust reverser for ground maintenance (AMM 78-31-00/201).

S 013-007

(5) Open the access door to the oil tank on the left core cowl panel.
F. ENGINES PRE-PW-SB 79-47, OR 79-65;
Do a check of the oil level for the left engine:

EFFECTIVITY

ALL

12-13-01

01C

Page 304
Aug 22/02

S 033-008

WARNING: DO NOT OPEN THE OIL TANK CAP FOR FIVE MINUTES AFTER SHUTDOWN OF THE ENGINE. A MINIMUM OF FIVE MINUTES IS NECESSARY TO LET PRESSURE IN THE OIL TANK BLEED OFF. IF YOU DO NOT DO THIS, A FAST FLOW OF HOT OIL CAN OCCUR AND CAUSE INJURY TO YOU.

WARNING: DO NOT KEEP THE OIL ON YOUR SKIN FOR A LONG TIME. IF YOU DO NOT CLEAN THE OIL OFF, THE OIL CAN CAUSE INJURY.

CAUTION: DO NOT MIX THE NAME BRAND OILS UNLESS YOU ARE SURE THEY AGREE. SOME OILS WILL CHEMICALLY CHANGE WHEN YOU MIX THEM. THIS CAN CAUSE DAMAGE TO THE ENGINE.

CAUTION: IF YOU DO NOT CLEAN THE OIL OFF, THE OIL CAN CAUSE A STAIN ON YOUR CLOTHES AND DAMAGE TO PAINT CAN OCCUR.

- (1) Remove the oil tank cap from the filler neck (AMM 79-11-03/201).

S 213-009

- (2) Examine the oil level.

NOTE: The correct level of oil is at the bottom of the "V" made by the valve of the filler neck valve.

- (a) If you see "black oil" in the oil system refer to the inspection for black oil (AMM 72-00-00/601).

NOTE: Black oil can be an indication of a serious problem or it can be a condition that requires no maintenance action.

S 683-010

- (3) If the oil level is too high, do the steps that follow:
 - (a) Put a container below the magnetic chip detector.
 - (b) Remove the magnetic chip detector to drain the oil from the oil tank (AMM 79-21-10/401).

NOTE: You can use the PWA 86018 Adapter to drain the oil from the oil tank. If you use the PWA 86018 Adapter, remove only the magnetic chip detector probe.

- (c) If you do not use the PWA 86018 Adapter, permit 10 quarts of oil to drain from the opening at the location of the magnetic chip detector.

EFFECTIVITY

ALL

12-13-01

01C

Page 305
Aug 22/02

- (d) If you use the PWA 86018 Adapter, do the steps that follow:
- 1) Install the PWA 86018 Adapter in the location of the magnetic chip detector probe.
 - 2) Permit 10 quarts of oil to drain from the oil tank.
 - 3) Remove the PWA 86018 Adapter.

WARNING: USE AMM 71-00-00 TO OPERATE THE POWER PLANT. IF YOU DO NOT USE THIS PROCEDURE, YOU CAN CAUSE DAMAGE TO EQUIPMENT OR INJURY TO PERSONS.

- (e) Use the Power Plant Dry-Motor procedure to motor the engine (AMM 71-00-00/201).
- (f) Use the Power Plant Dry-Motor procedure to do the engine shutdown (AMM 71-00-00/201).
- (g) Install the magnetic chip detector (AMM 79-21-10/401).

S 613-012

- (4) Fill the engine oil tank to the bottom of the filler neck valve:

NOTE: If the engine oil was fully drained from the engine, fill the engine oil tank. Fill the oil tank until the oil starts to flow into the scupper drain.

G. ENGINES PRE-PW-SB 79-47 OR 79-65;

Do a check of the oil level for the right engine:

NOTE: Fill the oil tank in the steps that follow.

S 033-019

CAUTION: FOR THE RIGHT ENGINE, IF THE OIL FLOWS OUT WHEN THE OIL TANK CAP IS OPENED, THIS IS AN OVERSERVICING CONDITION. DO NOT TRY TO ADD MORE OIL TO REPLACE THE OIL THAT HAS FLOWED OUT.

- (1) Remove the oil tank cap from the filler neck valve (AMM 79-11-03/201).

S 613-014

- (2) Put the engine oil into the oil tank until the oil starts to go over the top of the filler neck valve and in the scupper drain.

EFFECTIVITY

ALL

12-13-01

01C

Page 306
Aug 22/02

- H. ENGINES POST-PW-SB 79-47 OR 79-65;
Do a check of the oil level:

S 033-020

WARNING: DO NOT OPEN THE OIL TANK CAP FOR FIVE MINUTES AFTER SHUTDOWN OF THE ENGINE. A MINIMUM OF FIVE MINUTES IS NECESSARY TO LET PRESSURE IN THE OIL TANK BLEED OFF. IF YOU DO NOT DO THIS, A FAST FLOW OF HOT ENGINE OIL CAN OCCUR AND CAUSE INJURY TO YOU.

WARNING: DO NOT LET THE ENGINE OIL TOUCH YOUR SKIN FOR A LONG TIME. YOU CAN ABSORB TOXIC MATERIALS THROUGH YOUR SKIN IF YOU LET THE ENGINE OIL TOUCH YOUR SKIN FOR A LONG TIME.

WARNING: DO NOT TOUCH THE ENGINE OIL SYSTEM PARTS IF THE ENGINE IS HOT. THE OIL SYSTEM STAYS HOT FOR MORE TIME THAN THE OTHER ENGINE PARTS. YOU CAN INJURE YOURSELF IF YOU TOUCH A HOT OIL SYSTEM.

CAUTION: DO NOT MIX THE DIFFERENT TYPES OF ENGINE OILS UNLESS YOU ARE SURE THEY AGREE. SOME OILS WILL CHEMICALLY CHANGE WHEN YOU MIX THEM. THIS CAN CAUSE DAMAGE TO THE ENGINE.

CAUTION: DO NOT LET THE ENGINE OIL TOUCH PARTS WHICH DO NOT USUALLY TOUCH THE ENGINE OIL. THE ENGINE OIL CAN CAUSE DAMAGE TO THE RUBBER, PAINT, AND OTHER ENGINE PARTS.

CAUTION: DO NOT LET THE ALKALINE CLEANING FLUIDS TOUCH THE ENGINE OIL WHICH WILL GO INTO THE ENGINE. VERY SMALL QUANTITIES OF THE ALKALINE CLEANING FLUIDS WILL CAUSE DAMAGE TO THE ENGINE OIL.

- (1) Remove the oil tank cap from the filler neck (AMM 79-11-03/201).

S 213-021

- (2) Examine the oil level.

NOTE: Fill the oil tank with the steps that follow.

S 613-022

- (3) Put the engine oil into the oil tank until the engine oil starts to go over the top of the filler neck valve.

- I. If the oil system is empty when you fill the oil tank, do the steps that follow:

EFFECTIVITY

ALL

12-13-01

01C

Page 307
Aug 22/02

S 863-023

WARNING: USE AMM 71-00-00 TO OPERATE THE POWER PLANT. IF YOU DO NOT USE THIS PROCEDURE, YOU CAN CAUSE DAMAGE TO EQUIPMENT OR INJURY TO PERSONS.

- (1) Use the Power Plant Dry-Motor procedure to motor the engine (AMM 71-00-00/201).

S 863-024

- (2) Use the Power Plant Dry-Motor procedure to do the engine shutdown (AMM 71-00-00/201).

S 213-025

- (3) Examine the oil level again.

J. Put the airplane back to its initial condition

S 213-015

- (1) Examine the packing of the oil tank cap to make sure there is no sign of deterioration.

S 433-016

- (2) Install the oil tank cap (AMM 79-11-03/203).

S 413-017

- (3) Close the access door to the oil tank.

S 443-018

- (4) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

EFFECTIVITY

ALL

12-13-01

01C

Page 308
Feb 10/95

ENGINE STARTER - SERVICING (OIL REPLENISHING)

1. General

- A. The starter is a high speed unit. Keep the correct quantity of oil in the starter oil sump to keep the starter correctly lubricated. An incorrect oil level in the starter can cause the starter to become too hot. Damage can occur if the starter becomes too hot.

TASK 12-13-02-603-012

2. Engine Starter Servicing (Oil Replenishing) (Fig. 301)

A. General

- (1) This procedure gives the steps to do a gravity fill of the starter.

B. Equipment

- (1) Container - 30 ounces minimum capacity for oil

C. Consumable Materials

- (1) D00071 Lubricant - MIL-PRF-7808 (optional to MIL-PRF-23699).
(2) D00068 Lubricant - MIL-PRF-23699 (optional to MIL-PRF-7808).

D. References

- (1) AMM 71-11-04/201, Fan Cowl Panels
(2) AMM 71-11-06/201, Core Cowl Panels
(3) AMM 78-31-00/201, Thrust Reverser System

E. Access

(1) Location Zones

- 411 No. 1 Power Plant
421 No. 2 Power Plant

(2) Access Panels

- 415AL Fan Reverser (Left)
416AR Fan Reverser (Right)
425AL Fan Reverser (Left)
426AR Fan Reverser (Right)

F. Fill the Engine Starter

S 043-001

WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 013-002

- (2) Open the fan cowl panel (AMM 71-11-04/201).

S 013-003

- (3) Open the core cowl panels (AMM 71-11-06/201).

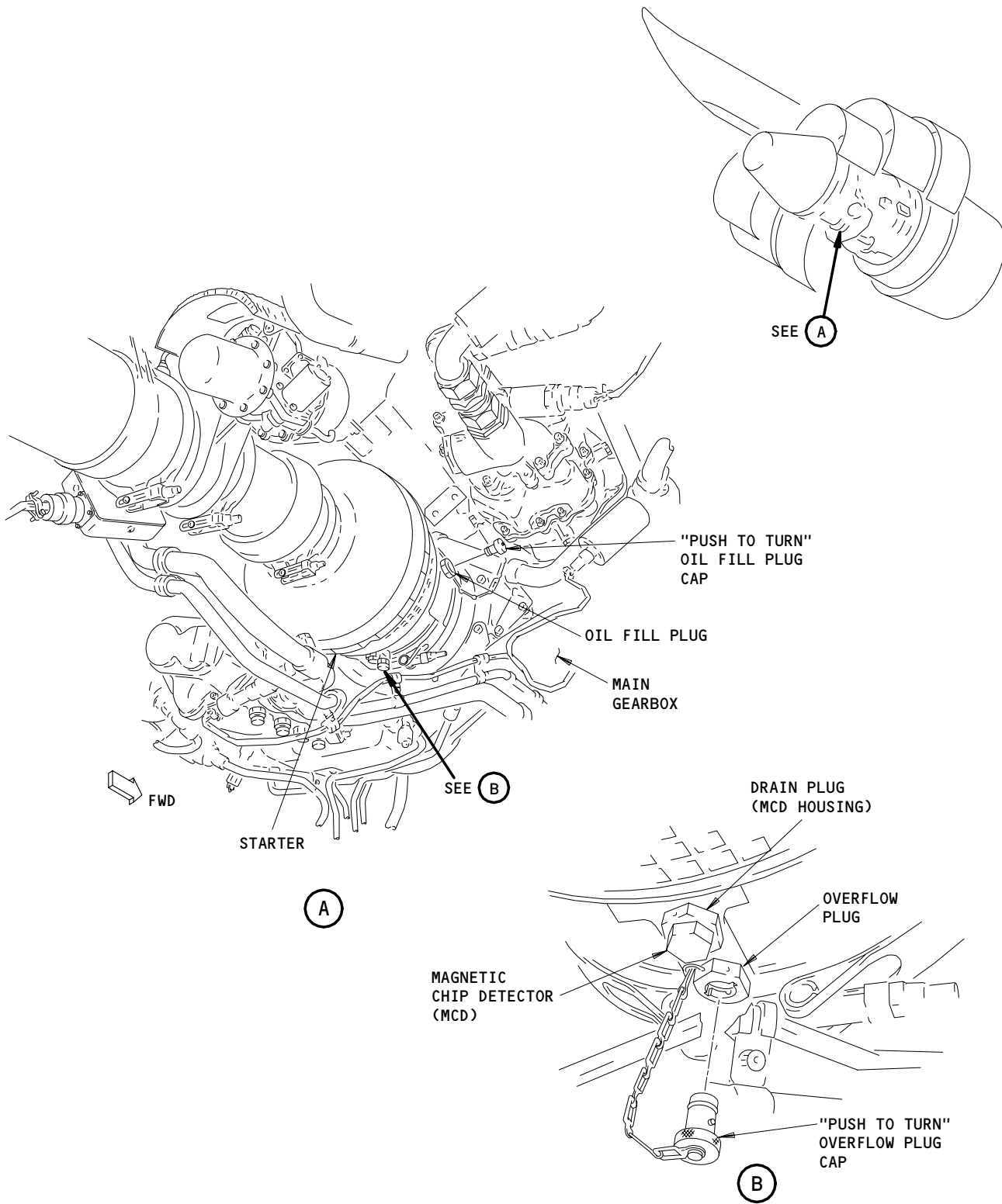
EFFECTIVITY

ALL

12-13-02

01C

Page 301
Apr 22/04



Starter Servicing - Oil Replenish
Figure 301

EFFECTIVITY	
	ALL

12-13-02

01C

Page 302
Aug 22/00

S 013-004

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Open the thrust reverser (AMM 78-31-00/201).

S 613-015

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN FOR A LONG PERIOD OF TIME. YOU CAN ABSORB POISONOUS MATERIALS FROM THE OIL THROUGH YOUR SKIN.

CAUTION: IMMEDIATELY CLEAN ALL THE OIL THAT FALLS ON AIRCRAFT PARTS. THE OIL CAN CAUSE DAMAGE TO THE PAINT AND RUBBER PARTS.

CAUTION: DO NOT MIX OIL OF DIFFERENT TYPES OR BRAND NAMES. SOME OILS WILL CHEMICALLY CHANGE WHEN YOU MIX THEM. THIS CAN CAUSE DAMAGE TO THE STARTER.

- (5) Do the steps that follow to do the gravity fill of the starter:
- (a) To release the caps from the oil fill plug and the overflow plug, push the caps in and turn counterclockwise.
 - (b) Remove the caps.
 - (c) Add oil to the starter until oil flows from the overflow port.

NOTE: You can use a plastic bottle with a plastic tube in the oil fill port to slowly fill the starter. This will let the air come out of the starter and prevent an incorrect full indication.

NOTE: The starter is full when approximately 22.5 fluid ounces (0.665 liters) of oil is added to the starter and oil starts to flow from the oil overflow port.

- (d) Install the caps on the oil fill plug and the overflow plug.

NOTE: For reference only, the torque value is 40-70 pound-inches (4.5-7.9 newton-meters) for the oil fill plug, and 20-40 pound-inches (2.3-4.5 newton-meters) for the overflow plug.

- 1) Put the caps on the plugs.
- 2) Push the caps in and turn clockwise until they lock.

S 143-017

- (6) Clean all unwanted oil from the surface of the starter.

EFFECTIVITY

ALL

12-13-02

01C

Page 303
Aug 22/00

S 413-008

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(7) Close the thrust reverser (AMM 78-31-00/201).

S 413-007

(8) Close the core cowl panel (AMM 71-11-06/201).

S 413-006

(9) Close the fan cowl panel (AMM 71-11-04/201).

S 443-005

(10) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

EFFECTIVITY

ALL

12-13-02

01C

Page 304
Aug 22/00

INTEGRATED DRIVE GENERATOR (IDG) – SERVICING

1. General

- A. This procedure has five tasks:
- (1) IDG Oil Level Check.
 - (2) IDG Oil Servicing
 - (3) Differential Pressure Indicator Check.
 - (4) IDG Oil Change
 - (5) IDG Oil Drain

TASK 12-13-03-213-007

2. IDG OIL Level Check (Fig. 303)

A. General

- (1) When the engine cowl panels are not open, the IDG oil level can be examined through the IDG access panel.

B. Reference

- (1) FIM 24-20-00/101, BPCU BITE

C. Access

- (1) Location Zones
 - 410 Power Plant Nacelle, Left Engine
 - 420 Power Plant Nacelle, Right Engine
- (2) Access Panels
 - 414BB IDG Access Panel, Left Engine
 - 424BB IDG Access Panel, Right Engine

D. Prepare to check the IDG Oil Level.

S 013-053

- (1) Open the IDG access panel.

E. IDG Oil Level Check.

S 283-048

CAUTION: A DISCONNECTED IDG MUST BE REMOVED FROM AN AIRPLANE IN LESS THAN 50 FLIGHT HOURS. AFTER 50 FLIGHT HOURS, DAMAGE TO THE IDG CAN OCCUR.

- (1) If the DISCONNECT TRIP message show on the bus power control unit (M116), correct the DISCONNECT TRIP message (FIM 24-20-00/101).

EFFECTIVITY

ALL

12-13-03

01

Page 301
Apr 22/00

BOEING

767 MAINTENANCE MANUAL

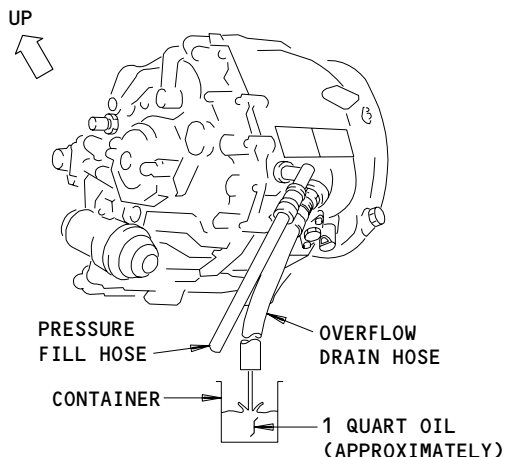
NOTE: DO NOT SERVICE IDG IF IDG IS DISCONNECTED. REFER TO 24-20-00 FAULT ISOLATION AND CORRECT "DISCONNECT TRIP" BITE MESSAGE.

STEP ONE

ATTACH OVERFLOW DRAIN AND PRESSURE FILL HOSES.

SOME OIL MAY COME OUT OVERFLOW DRAIN HOSE WHEN HOSE IS CONNECTED.

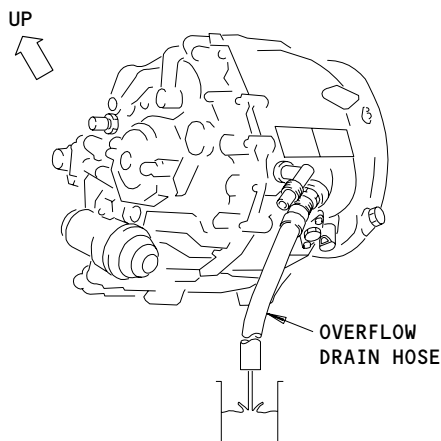
PUMP OIL INTO IDG UNTIL APPROXIMATELY ONE QUART OF OIL COMES OUT OVERFLOW DRAIN HOSE.



STEP TWO

REMOVE PRESSURE FILL HOSE ONLY.

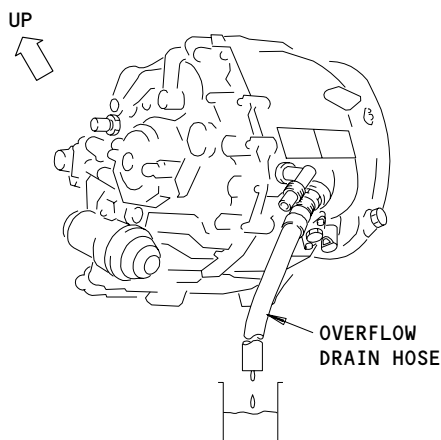
INSTALL COVER.



STEP THREE

REMOVE OVERFLOW DRAIN HOSE WHEN DRAINAGE SLOWS TO DROPS.

INSTALL COVER.



Summarized Servicing Procedure
Figure 301

EFFECTIVITY

ALL

12-13-03

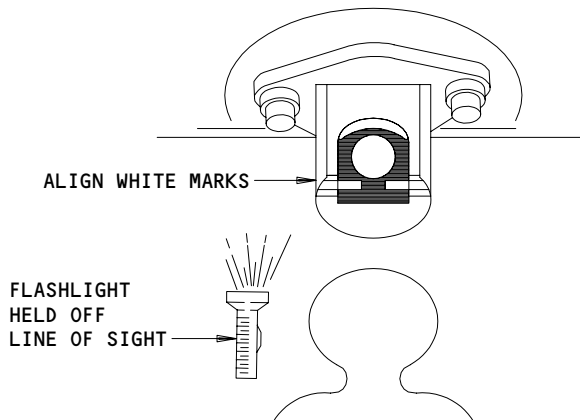
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Page 302
Nov 10/96

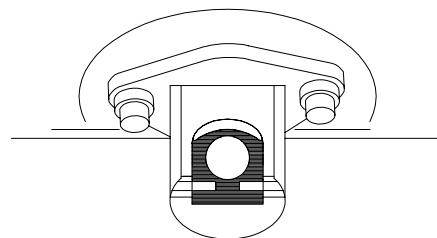
23898

NOTE: DO NOT CHECK OIL LEVEL IF IDG IS DISCONNECTED. REFER TO 24-20-00 FAULT ISLOATION AND CORRECT "DISCONNECT TRIP" BITE MESSAGE.

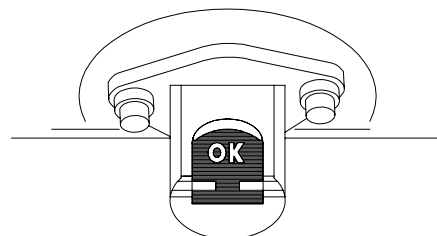
1. LOOK AT VIEWING FACE OF LOW OIL LEVEL INDICATOR.
 - WIPE CLEAN IF DIRTY
 - USE FLASHLIGHT IF IDG HAS "OK" LOW OIL INDICATOR OR IF TOO DARK TO SEE WHITE ALIGNMENT MARKS. DO NOT SHINE FLASHLIGHT DIRECTLY ON VIEWING FACE BECAUSE REFLECTION WILL MAKE READING DIFFICULT.
2. CHANGE YOUR LINE OF SIGHT UNTIL WHITE MARKS ARE ALIGNED.



3. LOOK FOR SILVER SPOT IN VIEWING FACE.
 - SILVER SPOT SEEN - SERVICING REQUIRED.
 - "OK" SEEN - SERVICING NOT REQUIRED.



ANY SILVER SPOT
LARGE OR SMALL
SERVICING REQUIRED



"OK"
NO SERVICING REQUIRED

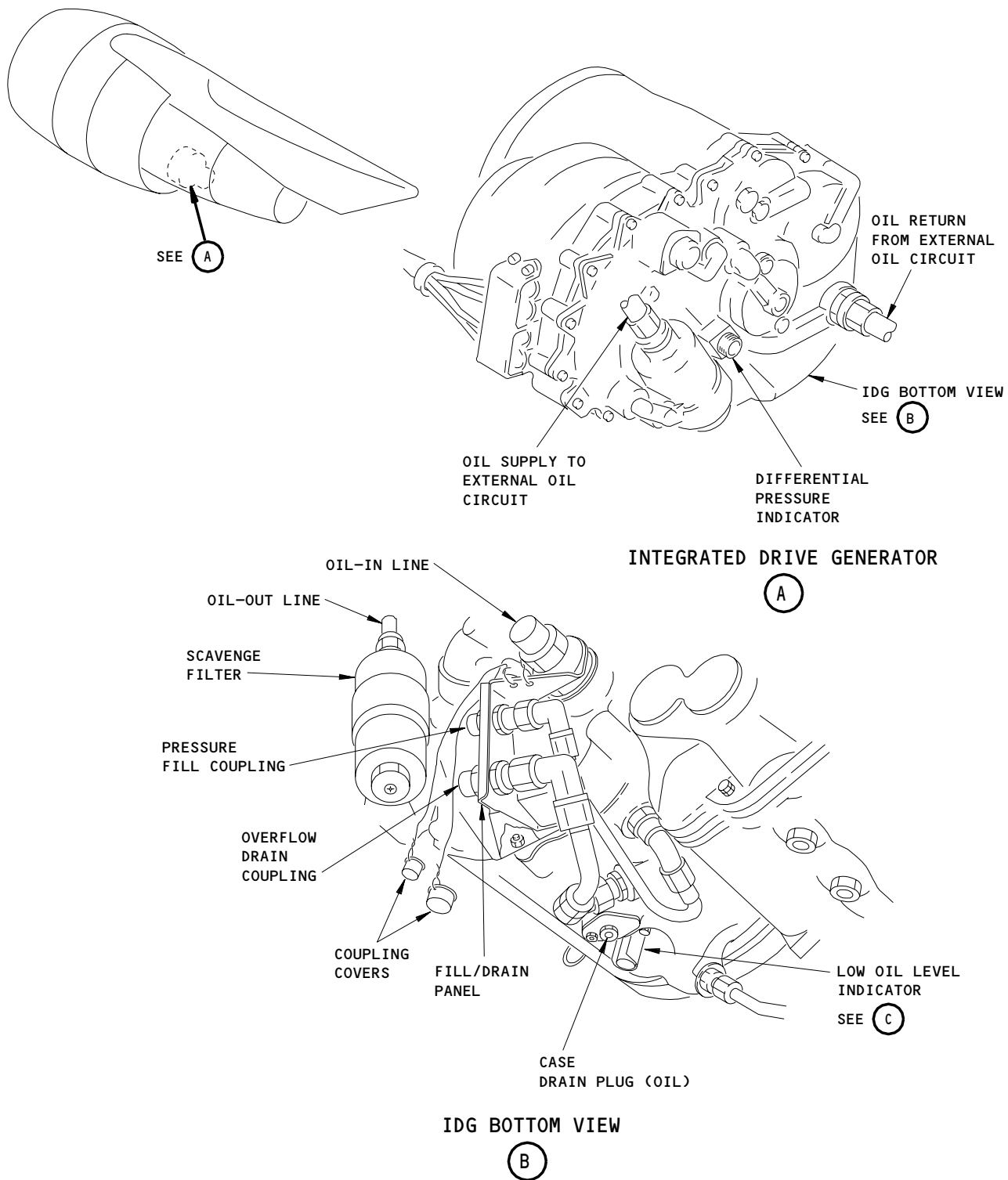
Summarized Low Oil Level Check Procedure
Figure 302

EFFECTIVITY	ALL
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12-13-03

03

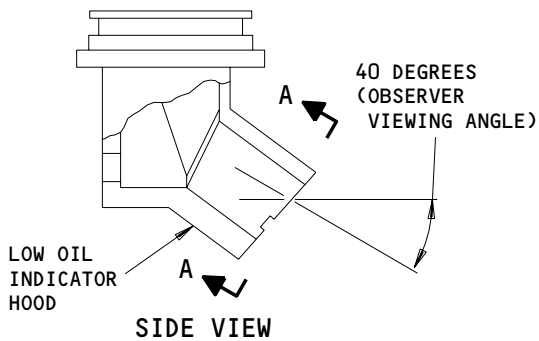
Page 303
Aug 10/93



Integrated Drive Generator Oil Servicing
Figure 303 (Sheet 1)

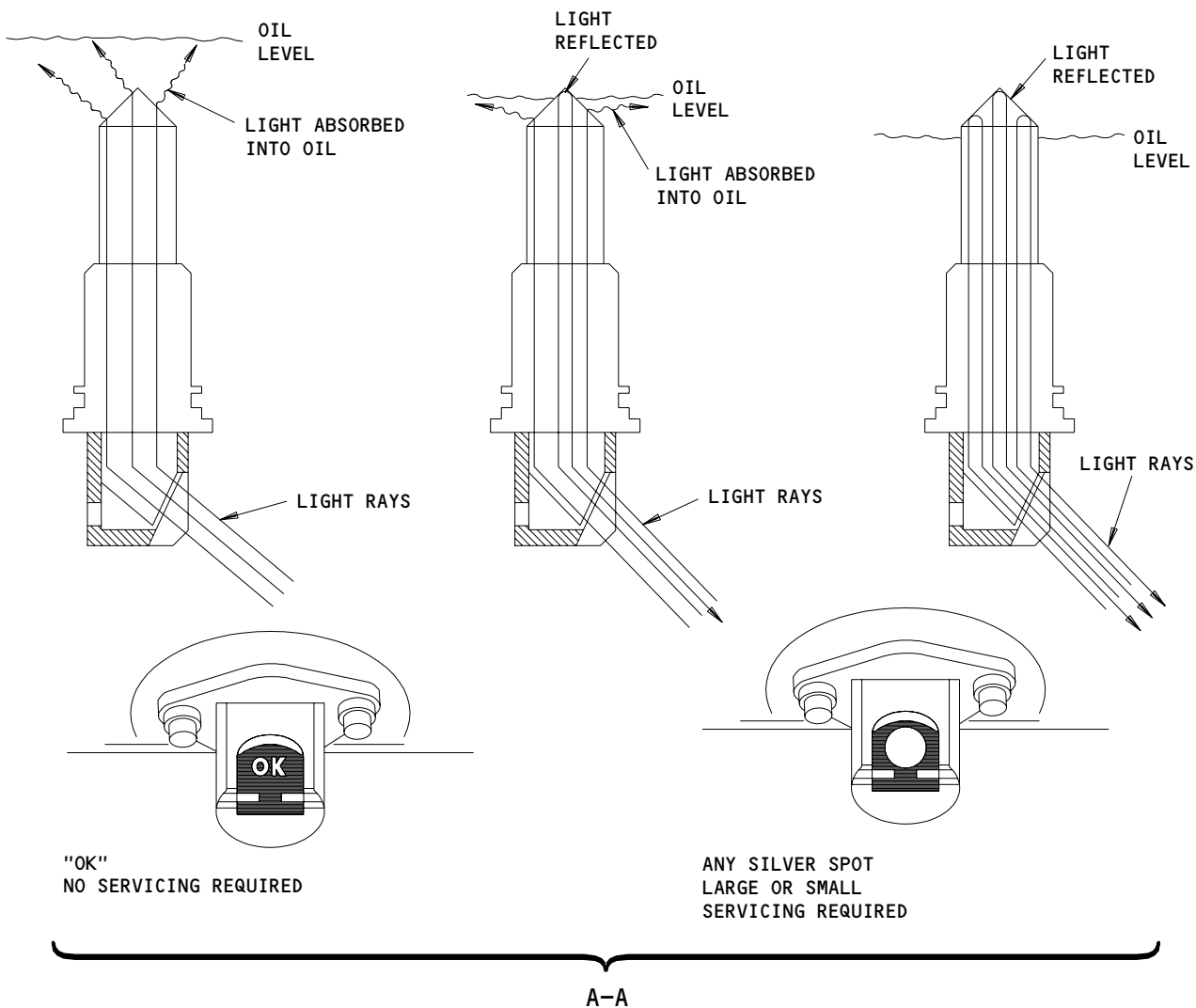
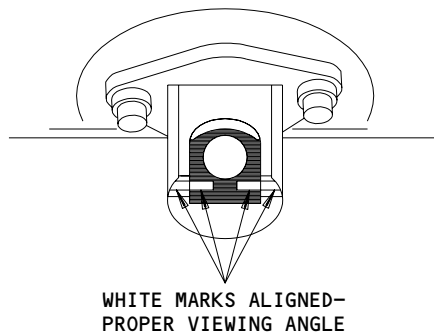
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	ALL

12-13-03



LOW OIL LEVEL INDICATOR

(C)



**Integrated Drive Generator Oil Servicing
Figure 303 (Sheet 2)**

EFFECTIVITY

ALL

12-13-03

04

Page 305
Aug 10/96

S 213-078

- (2) Do these steps to examine the IDG oil level:

NOTE: Do not do an oil level check on a disconnected IDG because the indication will be incorrect.

- (a) Make sure the engine has been shut down for a minimum of 5 minutes before checking oil level.
- (b) Clean the face of the oil level indicator if it is necessary.
- (c) Look into the view port of the oil level indicator
- (d) Align the white marks, found in the view port, in a straight line.

NOTE: A flashlight can be necessary to see the white marks. Do not point the light directly into the view port. Reflections can cause incorrect indications.

- 1) If you see an OK in the view port, the oil level in the IDG is correct.
- 2) If you see a silver mark in the view port, the oil level in the IDG is low.
 - a) Do the IDG Servicing procedure (AMM 12-13-03/301).

S 413-021

- (3) Close the IDG access panel.

TASK 12-13-03-613-026

3. IDG Oil Servicing (Fig. 303)

A. General

- (1) When the engine cowl panels are not open, the IDG can be serviced through the IDG access panel.

B. Equipment

- (1) Oil Service Dispenser - Risbridger UZ/7/1826 (preferred)
- (2) Oil Service Dispenser - Malabar WF150-1
- (3) Oil Service Cart -Malabar 53361

NOTE: The cart must have a Ozone coupling OMP2506-3 or the equivalent to connect with the pressure fill coupling.

- (4) Container - 5-gallon capacity
- (5) Overflow drain hose with outlet adapter, Ozone OMP2505-3 or optional oil overflow drain tool, Risbridger 2315 or equivalent

C. Consumable Materials

- (1) Oil - Aircraft turbine engines, synthetic base, MIL-PRF-23699 or MIL-PRF-7808 (AMM 20-30-04/201).

NOTE: When you change an oil type for the IDG, contact the vender, Hamilton Sundstrand, for their list of approved oils.

EFFECTIVITY

ALL

12-13-03

03

Page 306
Apr 22/08

D. Access

(1) Location Zones

- 410 Power Plant Nacelle, Left Engine
- 420 Power Plant Nacelle, Right Engine

(2) Access Panels

- 414BB IDG Access Panel, Left Engine
- 424BB IDG Access Panel, Right Engine

E. Prepare for the IDG Oil Servicing

S 013-002

- (1) Open the IDG access panel.

S 283-047

CAUTION: A DISCONNECTED IDG MUST BE REMOVED FROM AN AIRPLANE IN LESS THAN 50 FLIGHT HOURS. AFTER 50 FLIGHT HOURS, DAMAGE TO THE IDG CAN OCCUR.

- (2) If the DISCONNECT TRIP message show on the bus power control unit (M116), correct the DISCONNECT TRIP message (FIM 24-20-00/101).

F. IDG Oil Servicing

S 613-005

- (1) Do the IDG oil servicing as follows:

NOTE: Do not do oil servicing on a disconnected IDG because the oil level will be incorrect.

- (a) Remove the cover from the overflow drain coupling.
- (b) Put a container below the IDG to catch the oil which will flow from the IDG.
- (c) Put the end of the overflow drain hose into the container.

EFFECTIVITY

ALL

12-13-03

03

Page 307
Apr 22/00

WARNING: BE CAREFUL WHEN YOU CONNECT THE OVERFLOW DRAIN HOSE. THE PRESSURE IN THE IDG CAN CAUSE HOT OIL TO COME OUT OF THE OVERFLOW DRAIN COUPLING. HOT OIL CAN CAUSE INJURY TO PERSONS.

CAUTION: USE THE CORRECT ADAPTER TO RELEASE THE PRESSURE FROM THE IDG. AN INCORRECT ADAPTER WILL NOT RELEASE THE PRESSURE IN THE IDG. THIS CAN CAUSE AN INCORRECT OIL LEVEL IN THE IDG AND THE SUBSEQUENT FAILURE OF THE IDG.

- (d) Connect the overflow drain hose to the overflow drain coupling on the IDG.
1) Let the oil flow into the container.

NOTE: It is usual for some of the oil to drain from the IDG when you connect the hose.

- (e) Remove the cover from the pressure fill coupling.
(f) Connect the hose on the oil service equipment to the pressure fill coupling on the IDG.

CAUTION: WHEN YOU FILL THE IDG WITH OIL, YOU MUST NOT MIX TYPES OF OIL. IF YOU MIX THE OILS, YOU CAN CAUSE DAMAGE TO THE IDG.

- (g) Use the pump on the oil service equipment to fill the IDG with oil.

NOTE: When you start to put the oil into the IDG, oil could flow from the overflow drain hose. This does not show that the IDG is full.

- (h) Stop pumping oil into the IDG when approximately one quart of oil flows from the overflow drain hose into the container.

NOTE: The one quart (one liter) of oil does not include the oil that drained when the overflow drain hose was connected to ensure that the IDG oil level is correct.

- (i) Disconnect the hose on the oil service equipment from the IDG pressure fill coupling.
(j) Install the cover on the pressure fill coupling.

EFFECTIVITY

ALL

12-13-03

02

Page 308
Dec 22/07

CAUTION: DO NOT REMOVE THE OVERFLOW DRAIN HOSE FROM THE IDG UNTIL TWO MINUTES AFTER THE OIL FLOW HAS DECREASED TO DROPS. FAILURE TO DRAIN THE IDG CORRECTLY WILL CAUSE TOO MUCH OIL IN THE IDG. THIS CONDITION WILL CAUSE AN IMMEDIATE OVERHEAT CONDITION AND CAUSE DAMAGE TO THE IDG.

- (k) When the oil from the overflow drain hose decreases to a drop, wait two minutes then remove the overflow drain hose.
- (l) Install the cover on the IDG overflow drain coupling.

S 413-006

- (2) Close the IDG access panel.

TASK 12-13-03-213-023

4. Differential Pressure Indicator Check (Fig. 303)

A. General

- (1) When the engine cowl panels are not open, the differential pressure indicator (DPI) can be examined through the IDG access panel.

B. References

- (1) AMM 24-11-01/601, DPI Extension
- (2) AMM 24-11-02/201, Scavenge Filter

C. Access

(1) Location Zones

- 410 Power Plant Nacelle, Left Engine
- 420 Power Plant Nacelle, Right Engine

(2) Access Panels

- 414BB IDG Access Panel, Left Engine
- 424BB IDG Access Panel, Right Engine

D. Prepare to examine the Differential Pressure Indicator (DPI)

S 013-054

- (1) Open the IDG access panel.

E. Differential Pressure Indicator Check

S 213-022

- (1) Visually examine the red button on the DPI.
 - (a) Make sure that the red button does not extend from the DPI case.
 - (b) If the red button extends from the DPI case, do the Scavenge Filter Inspection/Check (AMM 24-11-02/201).

EFFECTIVITY

ALL

12-13-03

02

Page 309
Aug 22/05

- (c) If the red button extends from the DPI case, do the DPI Indicator inspection/check (AMM 24-11-01/601) and do the Scavenge Filter inspection/check (AMM 24-11-02/201).

S 413-010

- (2) Close the IDG access panel.

TASK 12-13-03-643-024

5. IDG Oil Change (Fig. 303)

A. Equipment

- (1) Oil Service Dispenser - Risbridger UZ/7/1826 (preferred)
- (2) Oil Service Dispenser - Malabar WF150-1
- (3) Oil Service Cart - Malabar 53361

NOTE: The cart must have a Ozone coupling OMP2506-3 or the equivalent to connect with the pressure fill coupling.

- (4) Container - 5-gallon capacity
- (5) Overflow drain hose with adapter, Ozone OMP2505-3

B. Consumable Materials

- (1) Oil - Aircraft turbine engines, synthetic base, MIL-PRF-23699 or MIL-PRF-7808 (AMM 20-30-04/201).

NOTE: When you change an oil type for the IDG, contact the vender, Hamilton Sundstrand, for their list of approved oils.

C. References

- (1) AMM 24-11-02/201, Scavenge Filter

D. Access

- (1) Location Zones
 - 410 Power Plant Nacelle, Left Engine
 - 420 Power Plant Nacelle, Right Engine

- (2) Access Panels

- 417AL/427AL Core Cowl Panels (Left)
- 418AR/428AR Core Cowl Panels (Right)
- 415/425 Thrust Reverser Panels (Left)
- 416/426 Thrust Reverser Panel (Right)

E. Change the IDG Oil

S 683-011

- (1) Drain the oil from the IDG (AMM 12-13-03/301), but do not install the drain plug.

S 613-079

- (2) Do these steps to change the IDG oil:
 - (a) Replace the Scavenge Filter (AMM 24-11-02/201).
 - (b) Remove the cover from the pressure fill coupling.
 - (c) Connect the hose from the oil service equipment to the pressure fill coupling on the IDG.

EFFECTIVITY

ALL

12-13-03

01

Page 310
Aug 22/05

CAUTION: WHEN YOU FILL THE IDG WITH OIL, YOU MUST NOT MIX TYPES OF OIL. IF YOU MIX THE OILS, YOU CAN CAUSE DAMAGE TO THE IDG.

- (d) Use the pump on the oil service equipment to flush the IDG with oil.
- (e) Pump oil slowly into the IDG until the color of the oil that flows from the case drain is the same color of the oil pumped into the IDG or until 1.0 to 1.5 gallons (3.7 to 5.6 liters) of oil are collected from the case drain.

NOTE: The 1 to 1.5 gallons of oil does not include the oil that was already drained in previous steps.

- (f) Lubricate and install a new O-ring on the drain plug for the IDG.
- (g) Install the drain plug in the IDG.
- (h) Tighten the drain plug to torque of 55-75 pound-inches.
- (i) Install a lock wire on the drain plug.

S 613-018

- (3) Do the IDG oil servicing (AMM 12-13-03/301).

S 793-081

- (4) Do the Engine Ground Test for Idle Power to do a check for Leaks (AMM 71-00-00/501).

S 793-082

- (5) Stop the engine and wait for five minutes for the oil level to become stable (AMM 71-00-00/501).

S 793-083

- (6) Do this task: "IDG Oil Level Check" (AMM 12-13-03/301).

S 613-084

- (7) If the oil level is incorrect, do this task: "IDG Oil Servicing" (AMM 12-13-03/301).

EFFECTIVITY

ALL

12-13-03

01

Page 311
Dec 22/00

S 723-089

- (8) Do a check for oil leaks at the IDG and external oil cooling system. Repair any leaks you find.

TASK 12-13-03-683-013

6. IDG Oil Drain (Fig. 303)

A. General

- (1) This task should only be done when referenced by another procedure. After the IDG oil has been drained, the IDG should be re-serviced or removed. With no oil, the IDG cannot be operated.
- (2) You must open the thrust reverser cowls to drain the oil from the IDG.

B. Equipment

- (1) Container - 5-gallon capacity
- (2) Overflow drain hose with adapter, Ozone OMP2505-3

C. References

- (1) AMM 71-11-04/201, Fan Cowl Panel
- (2) AMM 71-11-06/201, Core Cowl Panel
- (3) AMM 78-31-00/201, Thrust Reverser System

D. Access

- (1) Location Zones
 - 410 Power Plant Nacelle (Left)
 - 420 Power Plant Nacelle (Right)
- (2) Access Panels
 - 417/427 Core Cowl Panels (Left)
 - 418/428 Core Cowl Panels (Right)
 - 415/425 Thrust Reverser Panels (Left)
 - 416/426 Thrust Reverser Panel (Right)

E. Prepare to drain the oil from the IDG.

S 043-056

WARNING: DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Do the deactivation procedure for the thrust reverser for ground maintenance (AMM 78-31-00/201).

S 013-071

- (2) Open the fan cowl panels (AMM 71-11-04/201).

S 013-072

- (3) Open the core cowl panels (AMM 71-11-06/201).

EFFECTIVITY

ALL

12-13-03

01

Page 312
Apr 22/02

S 013-057

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Open the thrust reverser (AMM 78-31-00/201).

F. IDG Oil Drain

S 683-015

(1) Drain the oil from the IDG as follows:

- (a) Remove the cover from the overflow drain coupling.
- (b) Put a container below the IDG to catch the oil which will flow from the IDG.
- (c) Put the end of the overflow drain hose into the container.

WARNING: BE CAREFUL WHEN YOU CONNECT THE OVERFLOW DRAIN HOSE. THE PRESSURE IN THE IDG CAN CAUSE HOT OIL TO COME OUT OF THE COUPLING. HOT OIL CAN CAUSE INJURY TO PERSONS.

CAUTION: USE THE CORRECT ADAPTER TO RELEASE THE PRESSURE FROM THE IDG. AN INCORRECT ADAPTER WILL NOT RELEASE THE PRESSURE IN THE IDG. THIS CAN CAUSE AN INCORRECT OIL LEVEL IN THE IDG AND THE SUBSEQUENT FAILURE OF THE IDG.

- (d) Connect the overflow drain hose to the overflow drain coupling on the IDG.
- (e) Let the oil from the IDG to flow into the container.

NOTE: It is usual for some oil to drain from the IDG when you connect the hose.

(f) Remove the drain plug from the IDG.

NOTE: Be prepared to catch 1 to 1.5 gallons of oil.

- (g) Remove and discard the used O-ring from the drain plug.
- (h) Lubricate and install a new O-ring on the drain plug.
- (i) Install the drain plug in the IDG.
- (j) Tighten the drain plug to a torque of 55-75 pound-inches.
- (k) Install a lockwire on the drain plug.
- (l) Remove the overflow drain hose from the overflow drain coupling.
- (m) Install the cover on the overflow drain coupling.

EFFECTIVITY

ALL

12-13-03

01

Page 313
Apr 22/02

S 413-058

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Close the thrust reverser (AMM 78-31-00/201).

S 413-059

(3) Close the core cowl panel (AMM 71-11-06/201).

S 413-064

(4) Close the fan cowl panel (AMM 71-11-04/201).

S 443-065

(5) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

EFFECTIVITY

ALL

12-13-03

03

Page 314
Apr 10/98

APU – SERVICING (FILL THE OIL)

1. General

- A. This procedure is used to fill the oil in the APU to get the correct amount of oil necessary to operate the APU.
- B. The oil reservoir is on the bottom of the gearbox and holds 6.2 quarts of oil. A manual fill port (with a scupper drain) is on the left side of the gearbox. There are also pressure fill fittings that are aft of the manual fill port.
- C. You can use EICAS or the sight gage to do a check of the APU oil level. On some airplanes, the sight gage can be used with the APU off or with the APU in operation. The sight gage is aft of the oil fill port on the left side of the APU.
- D. There is a low oil level switch on the APU that sends a signal to EICAS when the oil level is 4.25 quarts or less (with the engine stopped). When EICAS gets this signal for 60 seconds, an APU OIL QTY message is put in the memory on the EICAS status and maintenance pages.
- E. There is an oil quantity transmitter that shows the oil quantity on EICAS. The EICAS computers get a signal from the oil quantity transmitter and shows the oil quantity on a scale of one as follows: FULL, 0.75, 0.50, 0.25, and ADD. When the oil quantity is at the ADD level (approximately 4.25 quarts with the APU stopped) the APU OIL QTY message also shows on EICAS.

TASK 12-13-04-613-001

2. APU – Servicing Procedure

A. General

- (1) You open the oil fill cap to fill the APU gearbox with oil. The oil fill cap is located on the right side of the APU gearbox.
- (2) The APU gearbox holds 6.2 quarts (5.8 liters).
- (3) Use only these types and brands of oil:
 - (a) Synthetic Base Oil, Type I – MIL-PRF-7808 (-65°F to 130°F, -54°C to 54°C):
 - 1) BP Aero Turbine Oil 15
 - 2) BP Turbo Oil 2389
 - 3) Brayco 880

EFFECTIVITY

ALL

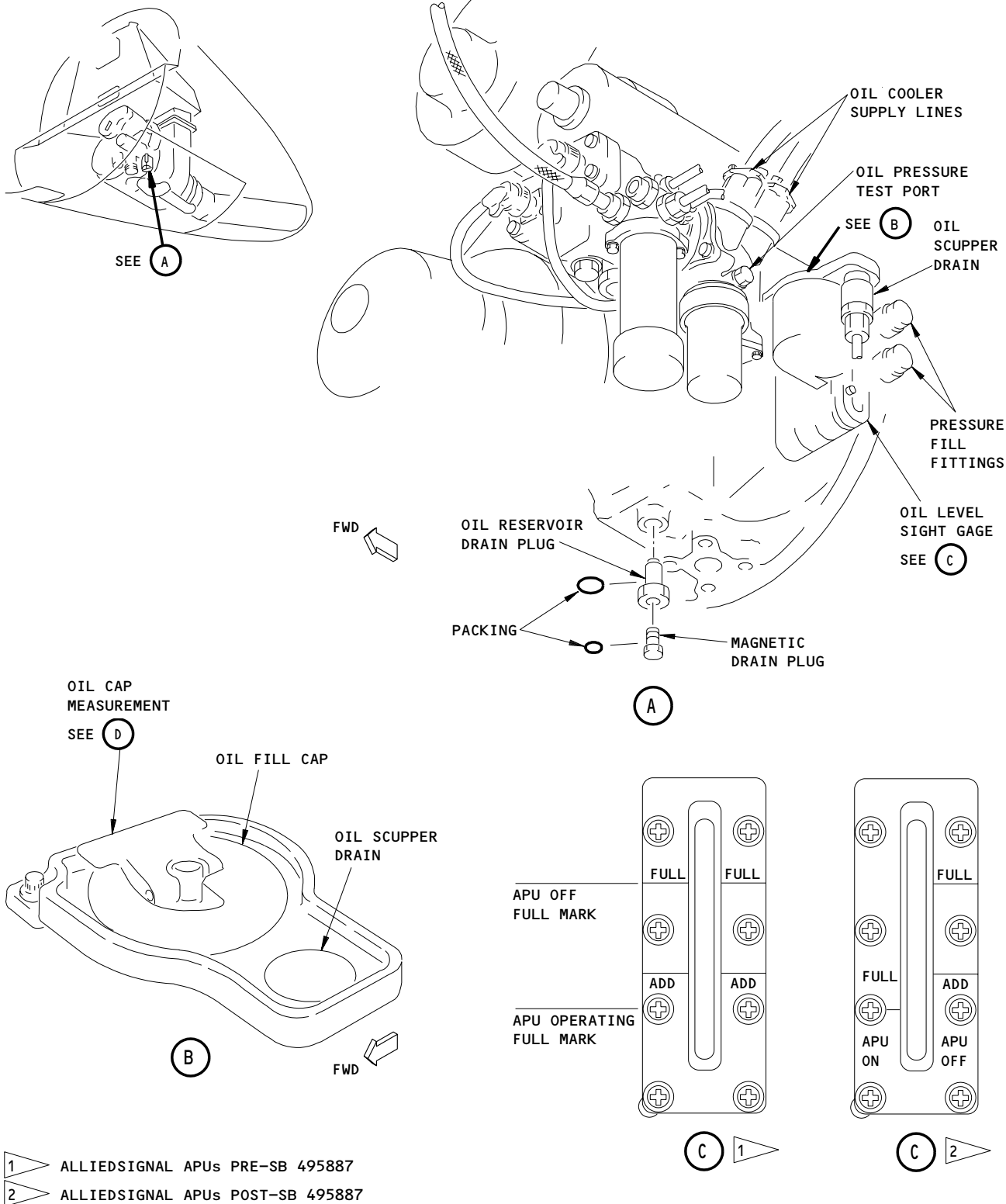
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Page 301
Apr 22/05

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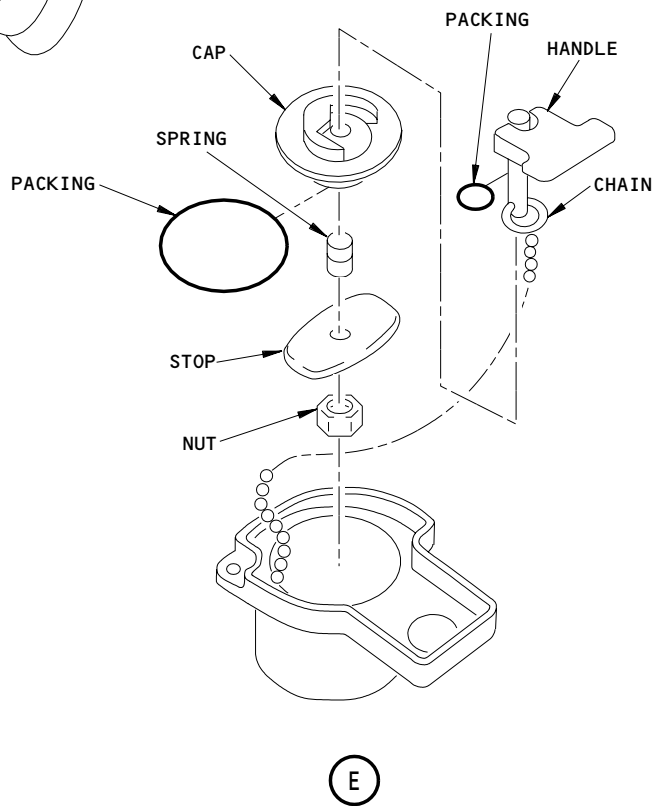
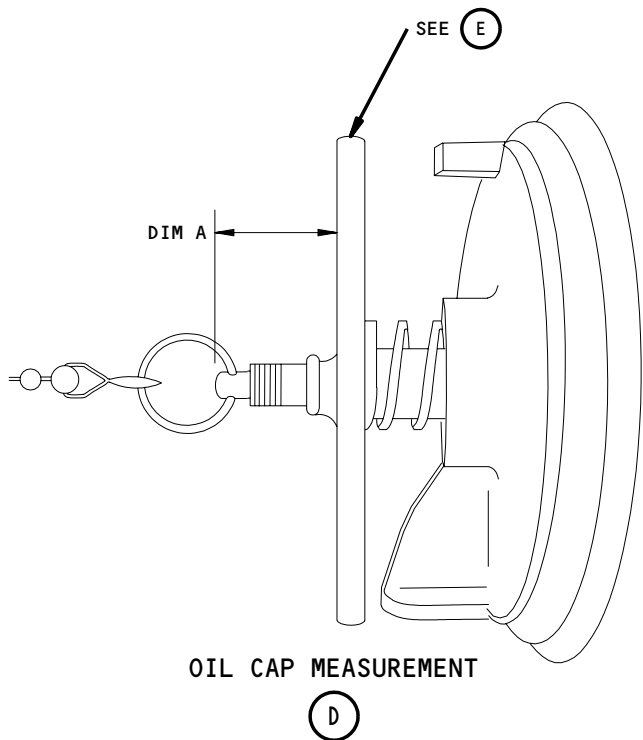
767 MAINTENANCE MANUAL



APU Oil Servicing
Figure 301 (Sheet 1)

EFFECTIVITY	
	ALL

12-13-04



APU Oil Servicing
Figure 301 (Sheet 2)

EFFECTIVITY	
	ALL

12-13-04

01

Page 303
Dec 22/07

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- 4) Castrol 3C
 - 5) Castrol 399
 - (b) Def Stan 91-94, Type I (-65°F to 130°F, -54°C to 54°C):
 - 1) Aeroshell Turbine Oil 390
 - 2) Castrol 325
 - (c) Synthetic Base Oil, Type II - MIL-PRF-23699 (-40°F to 130°F, -40°C to 54°C):
 - 1) Aeroshell or Royco Turbine Oil 500
 - 2) Aeroshell or Royco Turbine Oil 560
 - 3) BP Turbine Oil 2197
 - 4) Castrol 5000
 - 5) Hatco 3611
 - 6) Mobil Jet Oil 254
 - 7) Mobil Jet Oil II
 - 8) Royco 899
 - (d) DOD-L-85734 and Def Stan 91-100, Type II (-40°F to 130°F, -40°C to 54°C):
 - 1) Aeroshell Turbine Oil or Royco 555
- B. Consumable Materials
- (1) D00068 Oil, Aircraft Turbine Engine, Synthetic Base, Type II - MIL-PRF-23699 or D00071 Oil, Aircraft Turbine Engine, Synthetic Base, Type I - MIL-PRF-7808 or
 - (2) D00077 Aeroshell Turbine Oil 555, DOD-L-85734 and Def Stan 91-100, Type II or
 - (3) D00635 Aeroshell Turbine Oil 390, Def Stan 91-94, Type I or
 - (4) D00636 Castrol 325, Def Stan 91-94, Type I or
 - (5) D50031 Royco 555, DOD-L-85734 and Def Stan 91-100, Type II
- C. References
- (1) AMM 24-22-00/201, Electrical Power - Control
 - (2) AMM 31-41-00/201, EICAS
 - (3) AMM 49-11-00/201, Auxiliary Power Unit
- D. Access
- (1) Location Zones
 - 315 APU Compartment - Left
 - 316 APU Compartment - Right
 - (2) Access Panels
 - 315AL APU Access Door - Left
 - 316AR APU Access Door - Right
- E. Do a Check of the APU Oil Level.
- S 213-024
- (1) Use one of these procedures to do a check of the oil level in the APU:
 - (a) Use the EICAS display to do a check of the oil level.
 - 1) Supply electrical power (AMM 24-22-00/201).
 - 2) Look for the APU OIL QTY message on the EICAS STATUS display.

EFFECTIVITY

ALL

12-13-04

07

Page 304
Dec 22/07

- 3) If the APU OIL QTY message is on EICAS, fill the APU oil.
- (b) ON AN OIL SIGHT GAGE WITHOUT A FULL MARK FOR THE APU ON;
Use the sight gage when the APU is off to do a check of the oil level.
 - 1) Open the left APU access door, 315AL, and right APU access door, 316AR:
 - a) While you hold the left access door in the closed position, open the four latches on the right access door.

NOTE: The left access door will open fully and the right access door will drop approximately one inch (2.5 cm) from the fuselage frame when the last latch is opened.
 - b) Open the left access door to the fully open position and manually lock the hold-open strut.

NOTE: You push the center knob down and turn the knob clockwise to manually lock the hold-open strut.
 - c) Push the right access door up and pull the detent latch aft until the latch disengages and releases the access door from the fuselage frame.

NOTE: The location of the detent latch is at the forward end of the right access door.
 - d) Open the right access door to the fully open position and manually lock the hold-open strut.
 - 2) Look at the oil level in the sight gage.
 - 3) If the oil level is below the ADD on the sight gage for the APU OFF, fill the APU oil.

EFFECTIVITY

ALL

12-13-04

05

Page 305
Dec 22/07

WARNING: DO NOT REMOVE THE OIL FILL CAP WHEN THE APU IS IN OPERATION. IF THE OIL FILL CAP IS REMOVED WHEN THE APU OPERATES, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (c) ON AN OIL SIGHT GAGE WITH A FULL MARK FOR THE APU ON;
Use the sight gage when the APU operates to do a check of the oil level.

NOTE: You can only do a check of the APU oil level when the engine operates if the sight gage has a mark for the APU ON.

- 1) Open the left APU access door, 315AL, and right APU access door, 316AR:
- While you hold the left access door in the closed position, open the four latches on the right access door.

NOTE: The left access door will open fully and the right access door will drop approximately one inch (2.5 cm) from the fuselage frame when the last latch is opened.

- Open the left access door to the fully open position and manually lock the hold-open strut.

NOTE: You push the center knob down and turn the knob clockwise to manually lock the hold-open strut.

- Push the right access door up and pull the detent latch aft until the latch disengages and releases the access door from the fuselage frame.

NOTE: The location of the detent latch is at the forward end of the right access door.

- Open the right access door to the fully open position and manually lock the hold-open strut.
- 2) Look at the oil level in the sight gage.
- 3) If the oil level is below the FULL mark for the APU ON, do these steps:
- Use the APU Operation procedure to do the APU shutdown (AMM 49-11-00/201).
 - Fill the APU oil.

EFFECTIVITY

ALL

12-13-04

02

Page 306
Dec 22/07

F. Fill the APU Oil (Fig. 301).

S 863-004

- (1) Make sure the APU control switch is in the OFF position and attach a DO-NOT-OPERATE tag.

S 863-005

- (2) Open this circuit breaker on the overhead panel P11 and attach a DO-NOT-CLOSE tag:
(a) 11B35, APU ALTN CONT

S 863-006

- (3) Open this circuit breaker on the P49 APU Auxiliary Panel and attach a DO-NOT-CLOSE tag:
(a) 49C2, APU PRIME CONT

S 013-007

- (4) If it is necessary, open the left APU access door, 315AL, and right APU access door, 316AR:
(a) While you hold the left access door in the closed position, open the four latches on the right access door.

NOTE: The left access door will open fully and the right access door will drop approximately one inch (2.5 cm) from the fuselage frame when the last latch is opened.

- (b) Open the left access door to the fully open position and manually lock the hold-open strut.

NOTE: You push the center knob down and turn the knob clockwise to manually lock the hold-open strut.

- (c) Push the right access door up and pull the detent latch aft until the latch disengages and releases the access door from the fuselage frame.

NOTE: The location of the detent latch is at the forward end of the right access door.

- (d) Open the right access door to the fully open position and manually lock the hold-open strut.

EFFECTIVITY

ALL

12-13-04

05

Page 307
Dec 22/07

S 613-040

WARNING: DO NOT TOUCH THE COMPONENTS OF THE OIL SYSTEM IF THE APU IS HOT. THESE COMPONENTS STAY HOTTER THAN OTHER COMPONENTS. HOT COMPONENTS CAN BURN YOU.

WARNING: DO NOT LET HOT OIL GET ON YOU. PUT ON PROTECTIVE CLOTHES, GOGGLES, AND EQUIPMENT OR LET THE APU BECOME COOL. HOT OIL CAN BURN YOU.

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN. YOU CAN ABSORB POISONOUS MATERIALS FROM THE OIL THROUGH YOUR SKIN.

CAUTION: DO NOT LET OIL GET ON THE APU OR OTHER COMPONENTS. IMMEDIATELY CLEAN THE OIL WHEN IT FALLS ON THEM. OIL CAN CAUSE DAMAGE TO PAINT AND RUBBER.

- (5) Do these steps to fill the APU gearbox with oil:
(a) Clean the oil fill cap before it is removed.

WARNING: DO NOT REMOVE THE OIL FILL CAP IF THE APU IS HOT, AND THE OIL LEVEL IS AT OR ABOVE THE FULL MARK. THE HOT OIL CAN CAUSE INJURY.

- (b) Remove the oil fill cap.

CAUTION: DO NOT MIX TWO TYPES OF OIL (MIL-PRF-7808 AND MIL-PRF-23699) WHEN YOU ADD THE OIL IN THE APU. IT IS PERMITTED TO MIX DIFFERENT BRANDS OF OIL WITH THE SAME TYPE OF OIL WHEN YOU ADD THE OIL IN THE APU. A MIXTURE OF THE TWO TYPES OF OIL IN THE APU CAN CAUSE DAMAGE TO THE APU.

- (c) Slowly add oil until the oil flows into the scupper drain.

NOTE: It is recommended that you use Type I oil if the APU will be started in very cold conditions below -40°F (-40°C).

- (d) Check the packings on the oil fill cap, if you find deterioration or damage, do these steps:
- 1) Replace the packing on the cap.
 - 2) Measure and record dimension A.
 - 3) Remove the chain from the handle assembly.
 - 4) Remove the nut, stop, spring and cap from the handle.
 - 5) Replace the packing on the handle.
 - 6) Install the cap, spring, stop and nut on the handle and tighten the nut until dimension A you recorded in the previous steps is obtained.
 - 7) Install the chain onto the cap assembly.

EFFECTIVITY

ALL

12-13-04

01

Page 308
Dec 22/07

- (e) Install the oil fill cap and make sure the cap is tight.
- G. Fill the APU Oil (Pressure Fill Method) (Fig. 301)

S 863-025

- (1) Make sure the APU control switch is in the OFF position and attach a DO-NOT-OPERATE tag.

S 863-026

- (2) Open this circuit on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
(a) 11B35, APU ALTN CONT

S 863-037

- (3) Open this circuit breaker on the P49 APU Auxiliary Panel and attach a DO-NOT-CLOSE tag:
(a) 49C2, APU PRIME CONT

S 013-028

- (4) If it is necessary, open the left APU access door, 315AL, and right APU access door, 316AR:
(a) While you hold the left access door in the closed position, open the four latches on the right access door.

NOTE: The left access door will open fully and the right access door will drop approximately one inch (2.5 cm) from the fuselage frame when the last latch is opened.

- (b) Open the left access door to the fully open position and manually lock the hold-open strut.

NOTE: You push the center knob down and turn the knob clockwise to manually lock the hold-open strut.

- (c) Push the right access door up and pull the detent latch aft until the latch disengages and releases the access door from the fuselage frame.

NOTE: The location of the detent latch is at the forward end of the right access door.

- (d) Open the right access door to the fully open position and manually lock the hold-open strut.

S 033-012

- (5) Remove the caps from the pressure fill fittings.

S 143-013

- (6) Clean the pressure fill fittings.

EFFECTIVITY

ALL

12-13-04

06

Page 309
Dec 22/07

S 493-014

CAUTION: DO NOT MIX TWO TYPES OF OIL (MIL-PRF-7808 AND MIL-PRF-23699) WHEN YOU ADD THE OIL IN THE APU. IT IS PERMITTED TO MIX DIFFERENT BRANDS OF OIL WITH THE SAME TYPE OF OIL WHEN YOU ADD THE OIL IN THE APU. A MIXTURE OF THE TWO TYPES OF OIL IN THE APU CAN CAUSE DAMAGE TO THE APU.

IF YOU DO NOT CLEAN THE OIL OFF, THE OIL CAN CAUSE A STAIN ON YOUR CLOTHES AND PAINT CAN BECOME SOFT.

DO NOT PUT TOO MUCH OIL IN THE RESERVOIR OR YOU CAN CAUSE THE APU TO HAVE A SHUTDOWN FROM LOW OIL PRESSURE.

- (7) Connect the supply and the overflow hoses to the oil fill fittings.

S 613-015

- (8) Slowly add oil until you can see oil in the overflow hose.

NOTE: It is recommended that you use Type I oil if the APU will be started in very cold conditions below -40°F (-40°C).

S 493-016

- (9) When the oil from the overflow hose is at a slow drip, remove the pressure fill hoses.

S 433-017

- (10) Install the caps on the pressure fill fittings.
H. Put the Airplane Back to its Usual Condition

S 863-018

- (1) If the APU OIL QTY message is shown on EICAS, do the Maintenance Message Erase Procedure (AMM 31-41-00/201).

S 413-019

- (2) Close the left APU access door, 315AL, and right APU access door, 316AR:
(a) Manually unlock the two hold-open struts from the two APU access doors.

NOTE: You turn the center knob counterclockwise and pull the knob up to manually unlock the hold-open strut.

- (b) Lift the right access door until the detent latch engages and holds the access door on the fuselage frame.
(c) Lift the left access door until the two APU access doors are approximately aligned.
(d) Close the two APU access doors.
(e) Close the four latches on the right access door.

EFFECTIVITY

ALL

12-13-04

01

Page 310
Dec 22/07

- S 863-039
- (3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P49 APU Auxiliary panel:
(a) 49C2, APU PRIME CONT
- S 863-021
- (4) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead panel P11:
(a) 11B35, APU ALTN CONT
- S 863-022
- (5) Remove the DO-NOT-OPERATE tag from the APU control switch.
- S 863-023
- (6) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY

ALL

12-13-04

04

Page 311
Dec 22/07

AIR DRIVEN PUMP (ADP) – SERVICING

1. General

A. This procedure has this task:

- (1) Add oil to the gearbox on the air driven pump.

TASK 12-13-05-613-001

2. Add Oil to the Gearbox of the Air Driven Pump (Fig. 301)

A. General

- (1) The oil reservoir is in the bottom of the gearbox between the hydraulic pump and the air turbine. The oil capacity of the gearbox is approximately 1100 cc (36 fl. oz.). If you can see the button on the differential pressure indicator on the oil filter, you must replace the oil filter (AMM 29-11-31/401).

B. Consumable Materials

- (1) D00071 Lubricating Oil, MIL-PRF-7808
(optional to MIL-PRF-23699)
- (2) D00068 Lubricating Oil, MIL-PRF-23699
(optional to MIL-PRF-7808)

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

D. Access

- (1) Location Zone
195 Wing-to-Body - Aft Lower Half (Left)
- (2) Access Panel
195SL Air Driven Pump

E. Procedure

S 863-002

- (1) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
 - (a) 11D31, HYDRAULIC AIR PUMP

S 013-003

- (2) Open the access panel, 195SL, for the air driven pump (AMM 06-41-00/201).

S 033-004

- (3) Remove the dipstick from the fill port.

S 213-005

- (4) Make sure the oil level on the dipstick is correct.

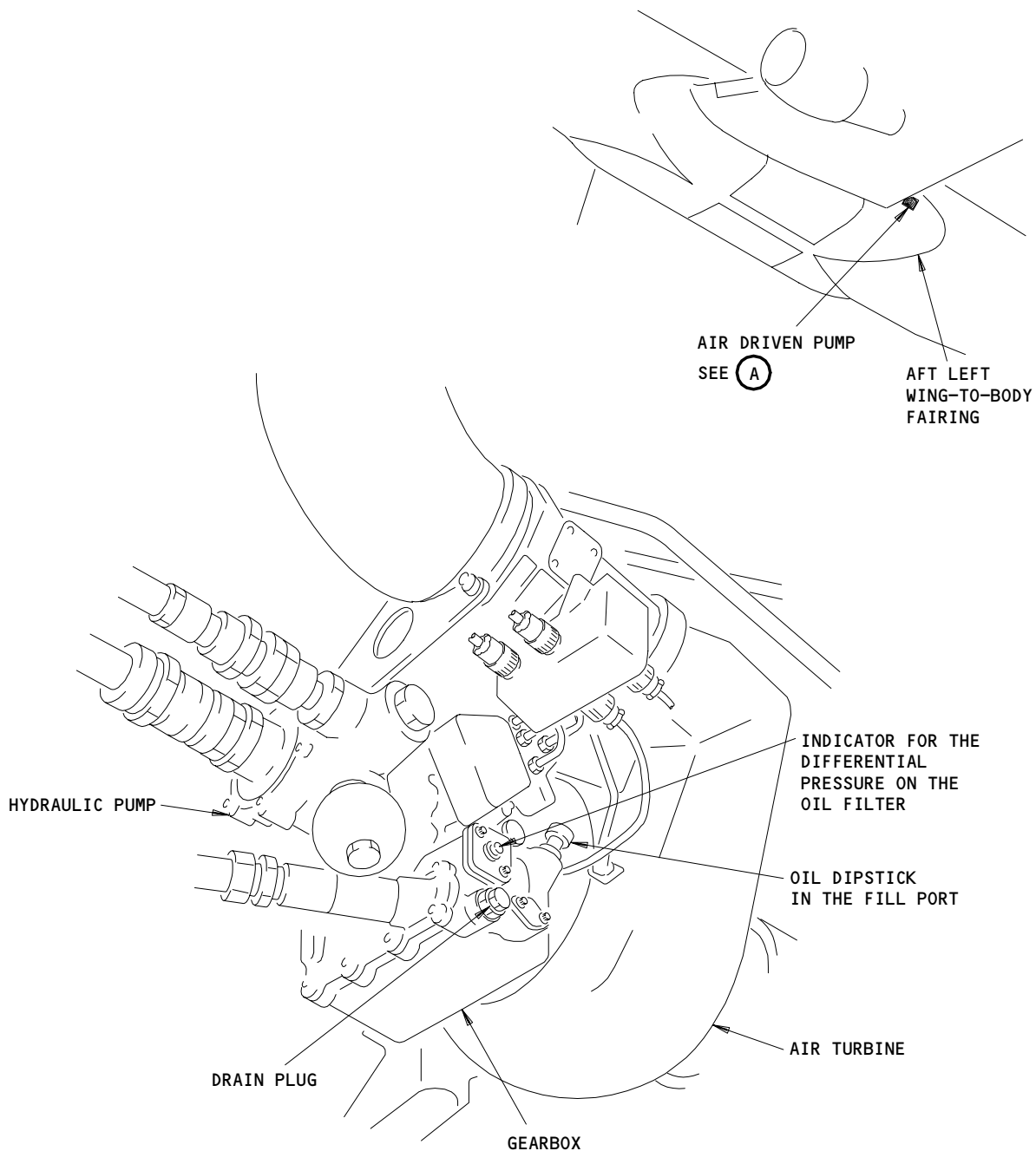
EFFECTIVITY

ALL

12-13-05

01

Page 301
Apr 22/04



AIR DRIVEN PUMP

(A)

Air Driven Pump
Figure 301

EFFECTIVITY	
	ALL

12-13-05

01

Page 302
Feb 10/91

49571

S 613-040

- (5) If it is necessary to add oil, put the oil into the fill port.

NOTE: Do not overfill the ADP reservoir. If you overfill, oil should be drained back out.

S 213-007

- (6) Do a check of the oil level on the dipstick again.

S 433-008

- (7) Install the dipstick in the fill port.

S 163-009

- (8) Remove the unwanted oil on the gearbox with a rag.

S 413-010

- (9) Close the access panel, 195SL, for the air driven pump (AMM 06-41-00/201).

S 863-011

- (10) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11D31, HYDRAULIC AIR PUMP

EFFECTIVITY

ALL

12-13-05

02

Page 303
Apr 22/03

STABILIZER TRIM BALLSCREW ACTUATOR-SERVICING

1. General

- A. The stabilizer trim ballscrew actuator oil reservoir is on the primary brake housing. The oil level must be to the bottom of the fill plug opening.

TASK 12-13-06-613-006

2. Stabilizer-Trim Ballscrew-Actuator Oil-Reservoir Servicing (Fig. 301)

A. Consumable Materials

- (1) D00070 Hydraulic Oil-MIL-H-5606

B. References

- (1) AMM 06-42-00/201, Empennage Access Panels and Doors

C. Access

- (1) Location Zone

312 Area Aft of Pressure Bulkhead to BS 1725 (Right)

- (2) Access Panels

312AR Stabilizer Trim Ballscrew Actuator

D. Prepare for Servicing

S 863-008

- (1) Remove the pressure from the center and left hydraulic systems (AMM 29-11-00/201).

S 863-009

- (2) Set the L and C STAB TRIM shutoff switches on the control stand panel, P10, to CUTOUT.

S 863-010

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
(a) 11A36, ALT STAB TRIM (if installed)
(b) 11C12, STAB TRIM SHUTOFF L
(c) 11C13, STAB TRIM SHUTOFF CENTER

S 013-002

WARNING: STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ACCESS DOOR FOR THE CONTROLS BAY, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

- (4) Open the access door 312AR, for the stabilizer trim ballscrew actuator (AMM 06-42-00/201).

E. Fill the Stabilizer-Trim Ballscrew Actuator Oil Reservoir

S 613-003

- (1) Make sure that the oil level is to the bottom of the fill plug hole. Do the following:
(a) Remove the fill plug.

EFFECTIVITY

ALL

12-13-06

02

Page 301
Apr 22/08

 **BOEING**
767
MAINTENANCE MANUAL

- (b) Verify that the oil level is at the bottom of the fill plug hole.

NOTE: If you can see the oil level in the sight gage, the oil level is too low. You need to add oil to the reservoir.

S 613-001

- (2) If the oil level is below the bottom of the fill plug, put oil into the fill port until oil comes back out of the fill port hole.
(a) Clean any spilled oil from the area.

S 423-012

- (3) Install the fill plug.

S 423-013

- (4) Tighten fill plug to 80-120 in-lbs (9-14 newton-meters).

S 433-004

- (5) Lockwire the fill plug.

S 413-005

- (6) Close the access door 312AR.

S 843-011

- (7) Put the airplane back to its usual condition.

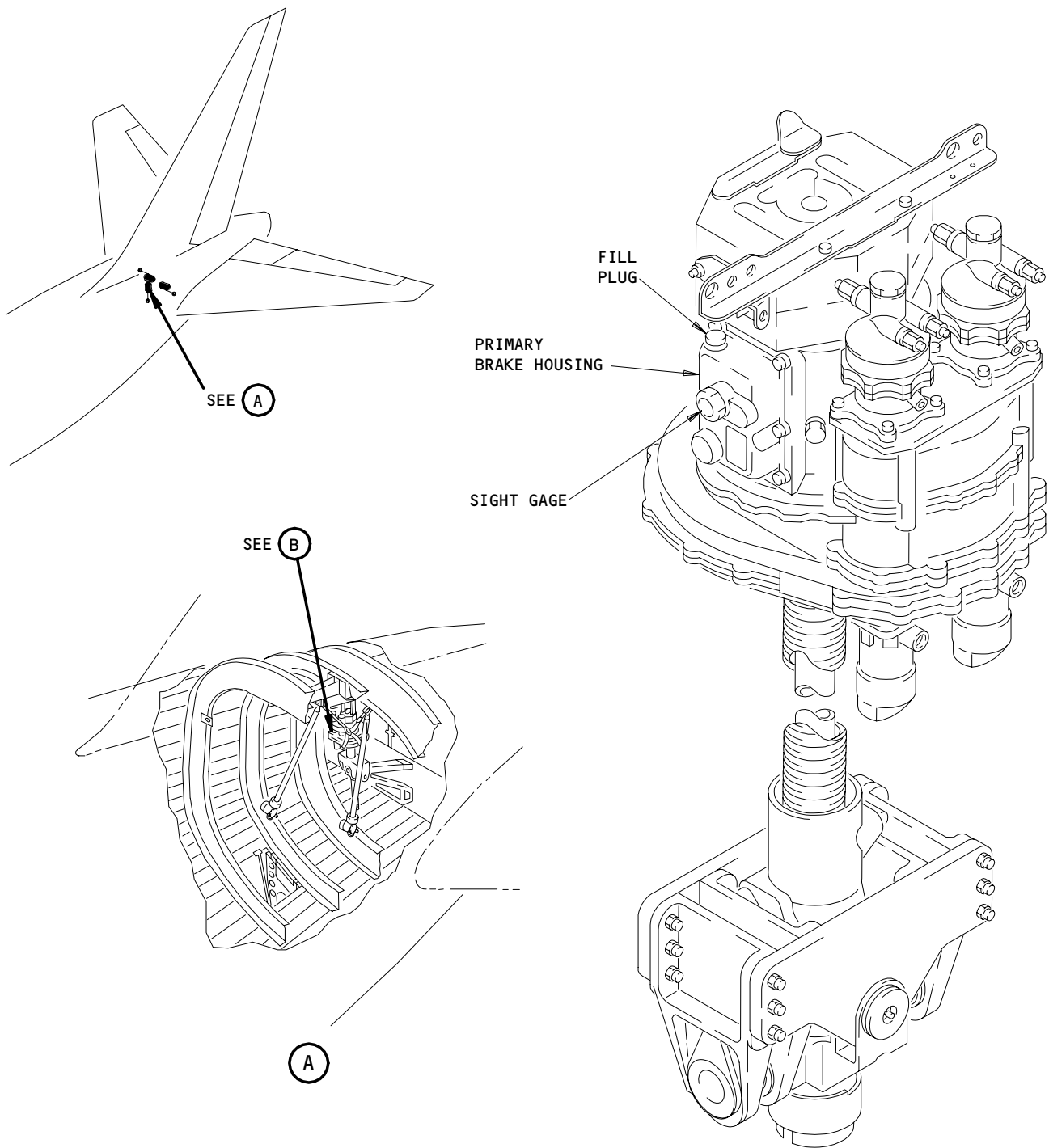
EFFECTIVITY

ALL

12-13-06

02

Page 302
Apr 22/09



STABILIZER-TRIM BALLSCREW ACTUATOR

(B)

Stabilizer-Trim Ballscrew Actuator Servicing
Figure 301

EFFECTIVITY

ALL

12-13-06

01

Page 303
Aug 22/02

TRAILING EDGE FLAP DRIVE SYSTEM – SERVICING (OIL REPLENISHING)

1. General

- A. This procedure contains a task to fill the trailing edge flap alternate drive motor (if necessary).

TASK 12-13-08-613-001

2. Trailing Edge Flap Alternate Drive Motor Servicing

A. Consumable Materials

- (1) D00070 Oil – Hydraulic, Petroleum Base, MIL-H-5606

B. References

- (1) AMM 24-22-00/201, Electrical Power – Control
(2) AMM 29-11-00/201, Main Hydraulic Supply System
(3) AMM 32-00-15/201, Landing Gear Door Locks
(4) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

(1) Location Zones

144	MLG Wheel Well (Right)
211/212	Control Cabin
710	Nose Landing Gear and Doors
730/740	Main Landing Gear and Doors

D. Prepare to Fill the Alternate Drive Motor

S 863-034

- (1) Supply electrical power (AMM 24-22-00/201).

S 213-035

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 013-036

WARNING: USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 863-037

- (4) Make sure the TE flaps and leading edge (LE) slats are fully retracted and the flap control lever is in the zero (FLAPS UP) detent.

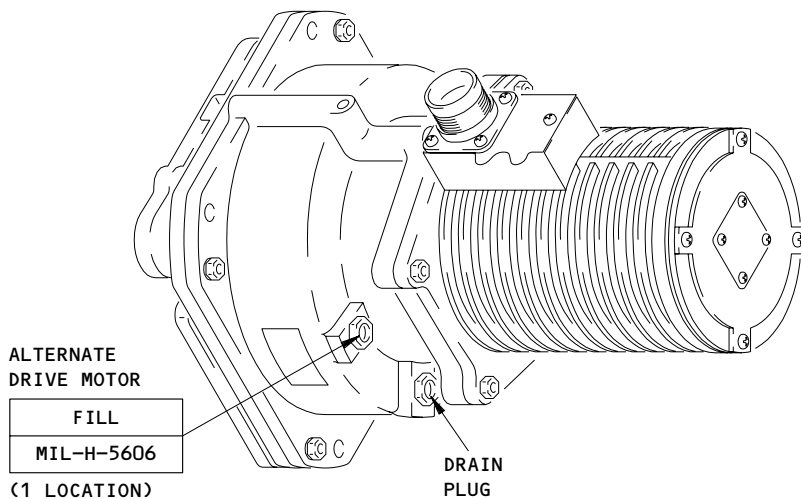
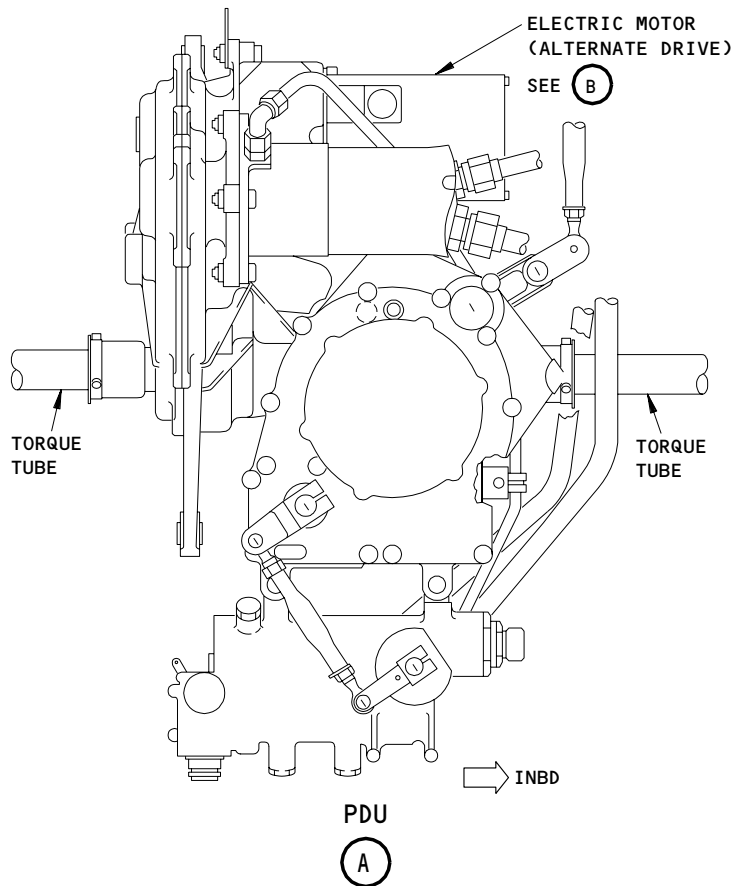
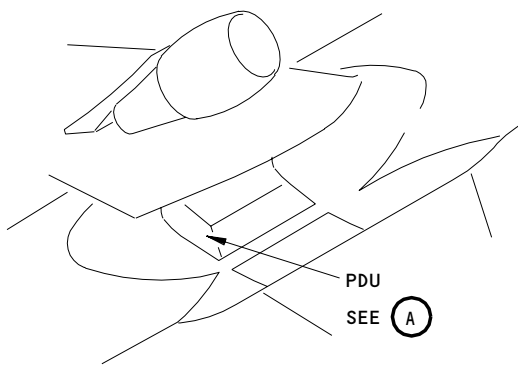
EFFECTIVITY
AIRPLANES WITH OIL-FILLED SERVICEABLE
ALTERNATE MOTORS

12-13-08

01

Page 301
Aug 22/01

- S 863-038
- (5) Install a DO-NOT-OPERATE tag on the flap control lever.
- S 863-039
- (6) Remove the pressure from the center hydraulic system and reservoir (AMM 29-11-00/201).
- S 863-040
- (7) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
 - (b) 6D24, ALTN FLAP PWR
 - (c) 6F24, ALTN SLAT OUTBD PWR
- S 863-041
- (8) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
 - (b) 11H24, SLAT ALTN CONT OUTBD
- E. Fill the Alternate Drive motor.
- S 023-033
- (1) If it is necessary, remove the flap alternate drive motor from the flap PDU (Fig. 301).
(AMM 27-51-34/201)
- NOTE:** Some alternate drive motors must be removed from the PDU to fill them with enough oil.
- S 613-009
- (2) Fill flap alternate drive motor P/N 4087T100 (spec. S256T011) with oil with the steps that follow (Fig. 301):
- (a) Remove the plug from the higher oil port of the alternate drive motor installed on the airplane.



INBD

1 4087T100 SERIES MOTORS

TE Flap Drive System - Servicing
Figure 301

EFFECTIVITY
AIRPLANES WITH OIL-FILLED SERVICEABLE
ALTERNATE MOTORS

12-13-08

01

Page 303
Dec 22/00

- (b) Add hydraulic fluid MIL-H-5606 to the alternate drive motor to the level of the bottom of the fill hole.
- (c) Install the plug in the oil port.

S 423-042

- (3) If removed, install the flap alternate drive motor on the flap PDU (Fig. 301).

F. Put the Airplane Back to Its Usual Condition

S 863-043

- (1) Supply electrical power (AMM 24-22-00/201).

S 413-044

WARNING: USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 863-045

- (3) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 863-046

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:
 - (a) 6D21, ALTN SLAT INBD PWR
 - (b) 6D24, ALTN FLAP PWR
 - (c) 6F24, ALTN SLAT OUTBD PWR

S 863-047

- (5) Remove the DO-NOT-CLOSE tags, and close these circuit breakers on the overhead panel, P11:
 - (a) 11H23, SLAT ALTN CONT INBD
 - (b) 11H24, SLAT ALTN CONT OUTBD

S 863-048

- (6) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

POTABLE WATER SYSTEM – SERVICING

1. General

- A. This procedure gives the instructions to fill the potable water tank and to drain the potable water system.
- B. This Section uses Configurations to identify the different configurations of potable water service panels used by an operator:
 - (1) CONFIG 1 – for airplanes with one (aft) potable water fill service panel, that has two separate port connections – a drain port and a fill port.
 - (2) CONFIG 2 – for airplanes with two (forward and aft) potable water fill service panels, that have a combined fill/drain connection port at each service panel.
 - (3) CONFIG 3 – for airplanes with one (aft) potable water fill service panel, that has a combined fill/drain connection port at the service panel.

TASK 12-14-01-613-001-001

2. Fill the Potable Water Tank (Fig. 301)

- A. Equipment
 - (1) Water Service Cart
- B. Access
 - (1) Location Zone
 - 155 Area Below Aft Cargo Compartment (Left)
 - (2) Access Panel
 - 124BR Potable Water Drain Panel (Forward)
 - 155AL Potable Water Service and Drain Panel (Aft)
- C. Fill the Potable Water Tank

S 683-019-001

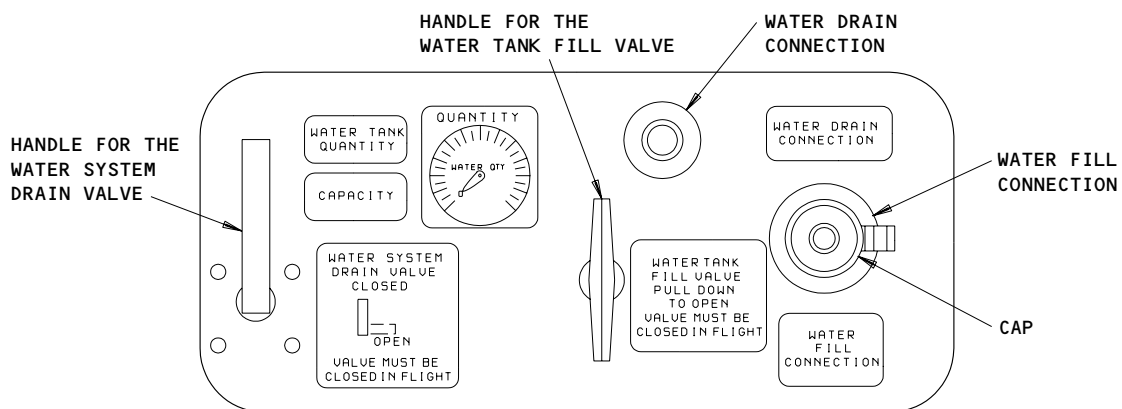
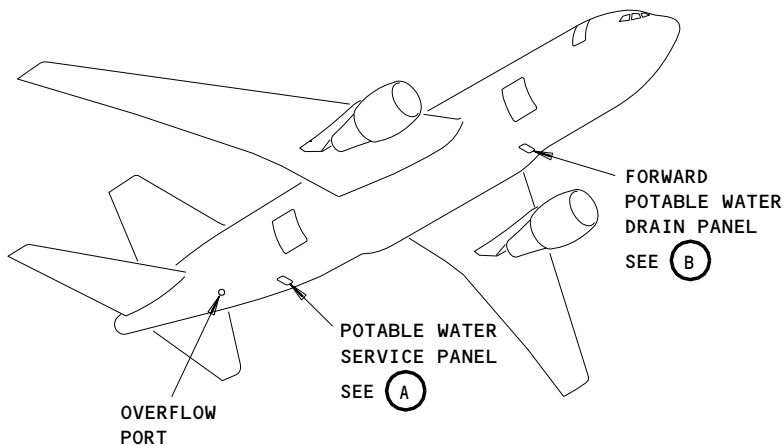
WARNING: DRAIN, OR USE THE POTABLE WATER SYSTEM A MINIMUM OF ONE TIME EACH THREE DAYS. IF YOU DO NOT DRAIN, OR USE THE WATER SYSTEM FREQUENTLY, BACTERIA CAN GROW IN THE WATER. IF YOU DRINK WATER WITH BACTERIA IN IT, ILLNESS CAN OCCUR.

- (1) Obey this warning during all of this task.

EFFECTIVITY
AIRPLANES WITH AFT FILL SERVICE PANEL
WITH TWO PORTS (SEPARATE FILL AND DRAIN)

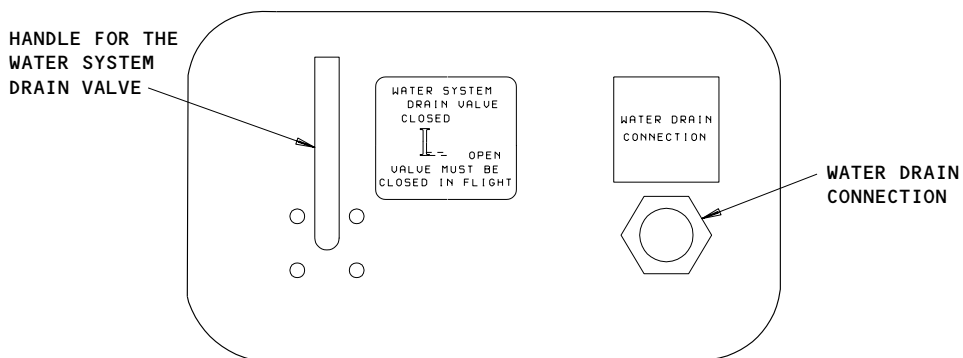
12-14-01
CONFIG 1
Page 301
Dec 22/06

01



POTABLE WATER SERVICE PANEL

(A)



FORWARD POTABLE WATER DRAIN PANEL

(B)

Potable Water System Servicing
Figure 301

EFFECTIVITY
AIRPLANES WITH AFT FILL SERVICE PANEL
WITH TWO PORTS (SEPARATE FILL AND DRAIN)

12-14-01

CONFIG 1

Page 302

Dec 22/02

01

S 493-002-001

- (2) Connect the water service cart as follows:
- (a) We recommend that you use a water pressure of 25 psi when you fill the potable water system.

NOTE: Do not use a water pressure of more than 55 psi.

- (b) Open the door for the potable water service panel.
- (c) Open the cap on the water fill fitting.
- (d) Connect the water supply hose to the water fill fitting.

S 863-003-001

- (3) Move the handle for the WATER TANK FILL VALVE to the OPEN position. This opens the WATER TANK FILL VALVE.

S 613-004-001

- (4) Fill the potable water tank. When you see water flow from the overflow port immediately stop the water supply.

S 863-005-001

- (5) Move the handle for the WATER TANK FILL VALVE to the CLOSED position.

NOTE: You must fully close the WATER TANK FILL VALVE for the water system to pressurize properly.

S 093-006-001

- (6) Disconnect the water service cart as follows:
- (a) Disconnect the water supply hose from the water fill connection.

CAUTION: MAKE SURE THE AIRPLANE FILL LINE IS FULLY DRAINED BEFORE YOU CLOSE THE CAP FOR THE FILL CONNECTION. IF THE FILL LINE IS NOT FULLY DRAINED, THE LINE CAN FREEZE WHICH CAN RESULT IN DAMAGE TO THE WATER LINES OR CONNECTIONS.

- (b) Let the water fully drain from the water fill connection.
- (c) Close the cap on the water fill connection.
- (d) Close the door for the potable water service panel.

EFFECTIVITY
AIRPLANES WITH AFT FILL SERVICE PANEL
WITH TWO PORTS (SEPARATE FILL AND DRAIN)

12-14-01
CONFIG 1
Page 303
Dec 22/02

01

S 863-007-001

- (7) If the circuit breakers were opened after the potable water system was drained, close these circuit breakers and remove the DO-NOT-CLOSE tags:
- (a) On the overhead panel, P11:
 - 1) 11U28, POT WATER PRESS
 - (b) On the forward miscellaneous electrical equipment panel, P33:
 - 1) 33H6, WATER SYS AIR CPRSR
 - (c) On the APU/EXT power panel, P34:
 - 1) 34P10, WATER QTY/PRESS
 - (d) On the left miscellaneous electrical equipment panel, P36:
 - 1) 36D6 or 36D7 or 36E7, WTR HTR LAV SYS 1
 - (e) On the right miscellaneous electrical equipment panel, P37:
 - 1) 37H7 or 37E7, WTR HTR LAV SYS 2

TASK 12-14-01-683-008-001

3. Drain the Potable Water System (Fig. 301)

A. Equipment

- (1) Water Service Cart

B. Access

- (1) Location Zones

- 124 Area Below Forward Cargo Compartment (Right)
- 155 Area Below Aft Cargo Compartment (Left)

- (2) Access Panel

- 124BR Potable Water Drain Panel (Forward)
- 155AL Potable Water Service and Drain Panel (Aft)

C. Drain the Potable Water System

S 683-020-001

WARNING: DRAIN, OR USE THE POTABLE WATER SYSTEM A MINIMUM OF ONE TIME EACH THREE DAYS. IF YOU DO NOT DRAIN, OR USE THE WATER SYSTEM FREQUENTLY, BACTERIA CAN GROW IN THE WATER. IF YOU DRINK WATER WITH BACTERIA IN IT, ILLNESS CAN OCCUR.

- (1) Obey this warning during all of this task.

S 863-021-001

- (2) Make sure all the shutoff valves for the galleys are open.

EFFECTIVITY
AIRPLANES WITH AFT FILL SERVICE PANEL
WITH TWO PORTS (SEPARATE FILL AND DRAIN)

12-14-01
CONFIG 1
Page 304
Aug 22/08

03

- S 863-038-001
- (3) If it is installed, open the drain valve to drain the water from each coffee maker or water boiler.

- S 863-022-001
- (4) For every lavatory on the airplane do these steps:
- (a) Make sure the shutoff valve for the lavatory is open.
 - (b) SAS AIRPLANES;
Do these steps.

NOTE: The lavatory faucets on MTH airplanes open automatically.

- 1) Push the lever on the lavatory washbasin faucet and hold it down.
- 2) Hold down the lever until the water stops draining from the water drain connection at the drain panels.

- S 013-010-001
- (5) Open the doors for the potable water service panel and for the potable water drain panel.

- S 493-011-001
- (6) Connect a drain line to each water drain connection.

- S 683-012-001
- (7) Move the two handles for the WATER SYSTEM DRAIN VALVES to OPEN (one on each panel).

- S 683-013-001
- (8) Move the handle for the WATER TANK FILL VALVE to the OPEN position. This will open the WATER TANK FILL VALVE.

- S 863-014-001
- (9) When all the water has drained from the potable water system move the handle for the WATER TANK FILL VALVE to the CLOSED position.

- S 863-015-001
- (10) Move the two handles for the WATER SYSTEM DRAIN VALVES to CLOSED.

- S 093-016-001
- (11) Disconnect the drain lines from the water drain connections.

- S 413-017-001
- (12) Close the doors for the potable water service panel and the forward potable water drain panel.

EFFECTIVITY
AIRPLANES WITH AFT FILL SERVICE PANEL
WITH TWO PORTS (SEPARATE FILL AND DRAIN)

12-14-01
CONFIG 1
Page 305
Aug 22/08

04

 **BOEING**
767
MAINTENANCE MANUAL

S 863-018-001

- (13) If you do not fill the potable water tank immediately after it is drained; then, open these circuit breakers and attach DO-NOT-CLOSE tags:
- (a) On the overhead panel, P11:
 - 1) 11U28, POT WATER PRESS
 - (b) On the forward miscellaneous electrical equipment panel, P33:
 - 1) 33H6, WATER SYS AIR CPRSR
 - (c) On the APU/EXT power panel, P34:
 - 1) 34P10, WATER QTY/PRESS
 - (d) On the left miscellaneous electrical equipment panel, P36:
 - 1) 36D6 or 36D7 or 36E7, WTR HTR LAV SYS 1
 - (e) On the right miscellaneous electrical equipment panel, P37:
 - 1) 37H7 or 37E7, WTR HTR LAV SYS 2

EFFECTIVITY
AIRPLANES WITH AFT FILL SERVICE PANEL
WITH TWO PORTS (SEPARATE FILL AND DRAIN)

12-14-01

CONFIG 1

Page 306

Aug 22/08

01

POTABLE WATER SYSTEM - SERVICING

TASK 12-14-01-603-001-002

1. Potable Water System (Fwd & Aft Fill Service Panels with One Port)

A. General

(1) This Configuration is NOT USED.

EFFECTIVITY
CONFIGURATION NOT USED

12-14-01

CONFIG 2

01A

Page 301

Dec 22/02

POTABLE WATER SYSTEM – SERVICING

1. General

- A. This procedure gives the instructions to fill the potable water tank(s) and to drain the potable water system.
- B. This Section uses Configurations to identify the different configurations of potable water service panels.
 - (1) CONFIG 1 – for airplanes with one (aft) potable water fill service panel, that has two separate port connections – a drain port and a fill port.
 - (2) CONFIG 2 – for airplanes with two (forward and aft) potable water fill service panels, that have a combined fill/drain connection port at each service panel.
 - (3) CONFIG 3 – for airplanes with one (aft) potable water fill service panel, that has a combined fill/drain connection port at the service panel.

TASK 12-14-01-613-001-003

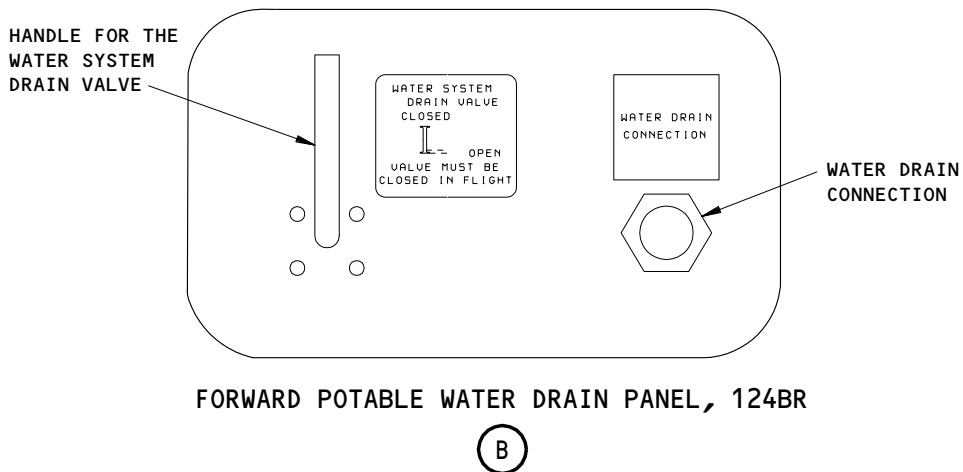
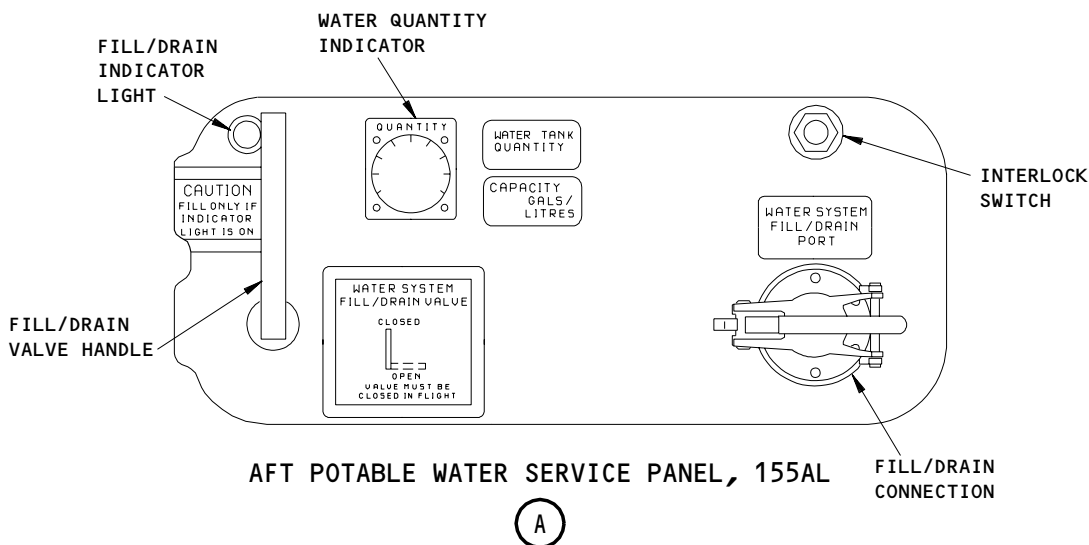
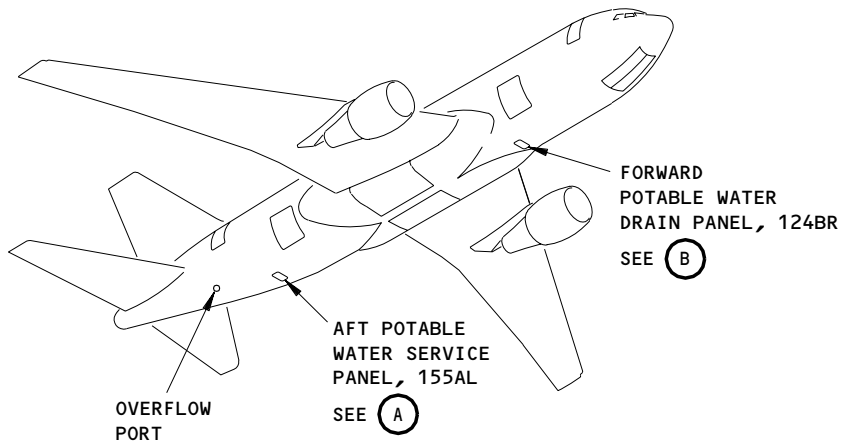
2. Fill the Potable Water Tank (Fig. 301)

- A. Equipment
 - (1) Water Service Cart
- B. References
 - (1) AMM 06-46-00/201, Fuselage Access Doors and Panels
 - (2) AMM 24-22-00/201, Electric Power Control
 - (3) AMM 25-52-01/401, Cargo Compartment Sidewall
 - (4) AMM 52-36-00/001, Bulk Cargo Door
 - (5) AMM 52-49-00/001, External Service Door
- C. Access
 - (1) Location Zones
 - 124 Area Below Forward Cargo Compartment (Right)
 - 166 Area Aft of Bulk Cargo Compartment (Right)
 - (2) Access Panel
 - 124BR Potable Water Drain Panel (Forward)
 - 155AL Potable Water Service Panel (Aft)
 - 811 Bulk Cargo Door
- D. Fill the Potable Water Tank (When Electrical Power is Available)

EFFECTIVITY
AIRPLANES WITH AFT FILL SERVICE PANEL
WITH ONE PORT (COMBINED FILL/DRAIN)

12-14-01
CONFIG 3
Page 301
Dec 22/02

01

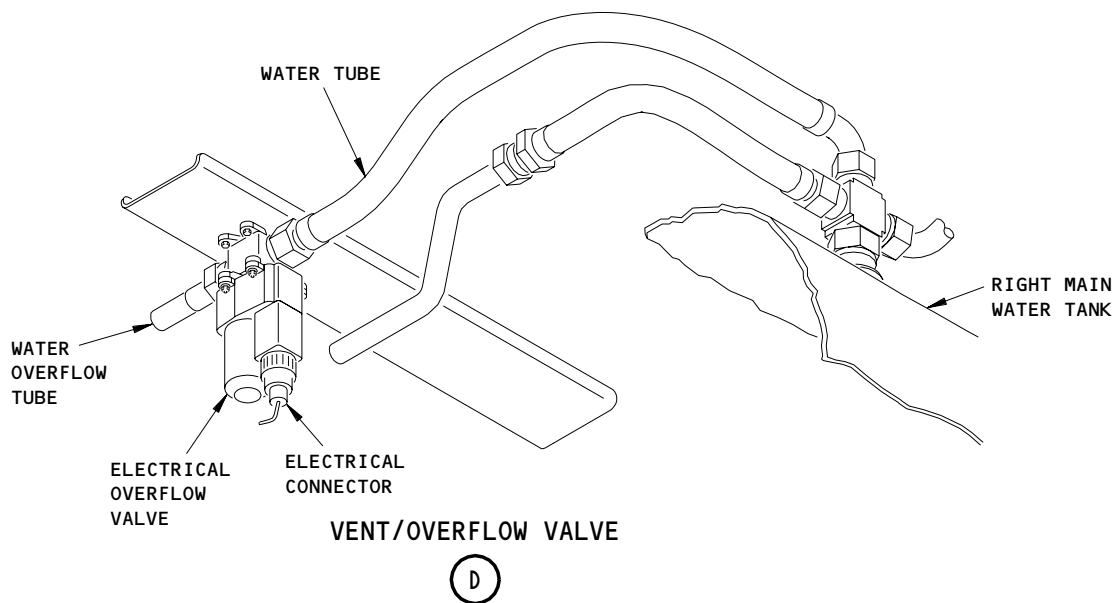
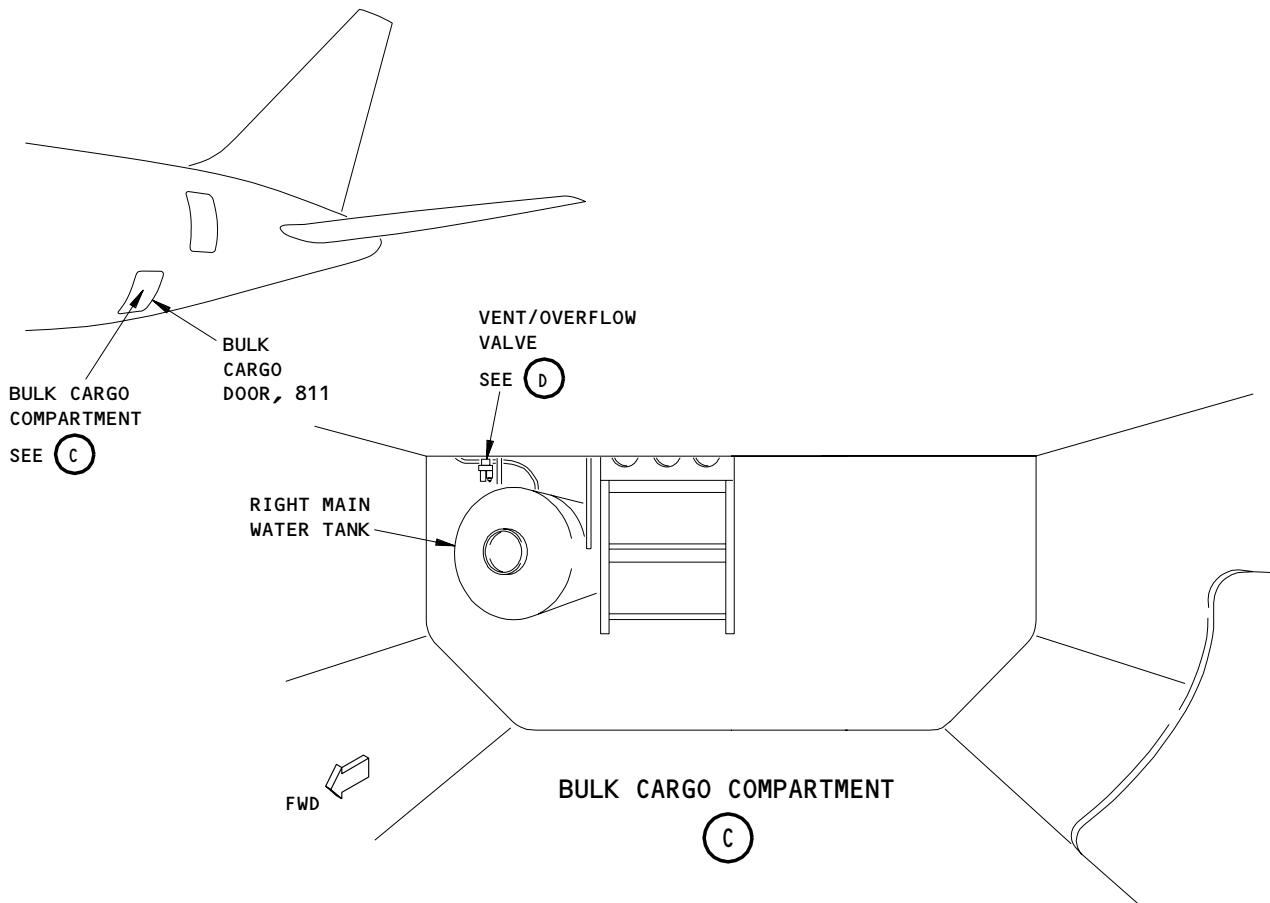


Potable Water System Servicing
Figure 301 (Sheet 1)

EFFECTIVITY
AIRPLANES WITH AFT FILL SERVICE PANEL
WITH ONE PORT (COMBINED FILL/DRAIN)

12-14-01
CONFIG 3
Page 302
Dec 22/02

01



Potable Water System Servicing
Figure 301 (Sheet 2)

EFFECTIVITY
AIRPLANES WITH AFT FILL SERVICE PANEL
WITH ONE PORT (COMBINED FILL/DRAIN)

12-14-01
CONFIG 3
Page 303
Dec 22/02

01

S 683-002-003

WARNING: DRAIN, OR USE THE POTABLE WATER SYSTEM A MINIMUM OF ONE TIME EACH THREE DAYS. IF YOU DO NOT DRAIN, OR USE THE WATER SYSTEM FREQUENTLY, BACTERIA CAN GROW IN THE WATER. IF YOU DRINK WATER WITH BACTERIA IN IT, ILLNESS CAN OCCUR.

(1) Obey this WARNING during all of this task.

S 863-003-003

(2) Supply electrical power (AMM 24-22-00/201).

S 493-004-003

(3) Connect the water service cart as follows:
(a) We recommend that you use a water pressure of 25 psi when you fill the potable water system.

NOTE: Do not use a water pressure of more than 55 psi.

(b) Open the door for the potable water service panel (AMM 52-49-00/001).
(c) Open the cap on the WATER SYSTEM FILL/DRAIN PORT connection.
(d) Connect the water supply hose to the WATER SYSTEM FILL/DRAIN PORT fitting.

S 863-005-003

(4) Move the handle for the WATER SYSTEM FILL/DRAIN VALVE to the OPEN position. This opens the water tank VENT/OVERFLOW VALVE.

S 713-006-003

(5) Make sure the FILL/DRAIN INDICATOR LIGHT is on.

S 613-007-003

(6) Fill the potable water tank. When you see water flow from the overflow port immediately stop the water supply.

S 863-008-003

(7) Move the handle for the WATER SYSTEM FILL/DRAIN VALVE to the CLOSED position.

NOTE: You must fully close the WATER SYSTEM FILL/DRAIN VALVE for the water system to pressurize properly.

EFFECTIVITY
AIRPLANES WITH AFT FILL SERVICE PANEL
WITH ONE PORT (COMBINED FILL/DRAIN)

12-14-01
CONFIG 3
Page 304
Dec 22/06

01

S 093-009-003

- (8) Disconnect the water service cart as follows:
- (a) Disconnect the water supply hose from the WATER SYSTEM FILL/DRAIN PORT connection.

CAUTION: MAKE SURE THE AIRPLANE FILL LINE IS FULLY DRAINED BEFORE YOU CLOSE THE CAP FOR THE FILL CONNECTION. IF THE FILL LINE IS NOT FULLY DRAINED, THE LINE CAN FREEZE WHICH CAN RESULT IN DAMAGE TO THE WATER LINES OR CONNECTIONS.

- (b) Let the water fully drain from the WATER SYSTEM FILL/DRAIN PORT connection.
- (c) Close the cap on the WATER SYSTEM FILL/DRAIN PORT connection.
- (d) Close the door for the potable water service panel.

S 863-010-003

- (9) Remove electrical power if it is not necessary (AMM 24-22-00/201).
E. Fill the Potable Water Tank (When Electrical Power is Not Available)

S 493-011-003

- (1) Connect the water service cart as follows:
- (a) Open the door for the potable water service panel (AMM 52-49-00/001).
 - (b) Open the cap on the WATER SYSTEM FILL/DRAIN PORT connection.
 - (c) Connect the water supply hose to the WATER SYSTEM FILL/DRAIN PORT connection.

S 863-012-003

- (2) Move the handle for the WATER SYSTEM FILL/DRAIN VALVE to the OPEN position.

S 013-013-003

- (3) Open the bulk cargo door, 811 (AMM 52-36-00/001).

S 013-014-003

- (4) Remove the aft right bulkhead lining of the bulk cargo compartment (AMM 25-52-01/401).

S 863-015-003

- (5) Manually open the VENT/OVERFLOW VALVE.

NOTE: Without electrical power the indicator light on the potable water service panel will not come on.

EFFECTIVITY
AIRPLANES WITH AFT FILL SERVICE PANEL
WITH ONE PORT (COMBINED FILL/DRAIN)

12-14-01
CONFIG 3
Page 305
Dec 22/02

01

- S 613-016-003
- (6) Fill the potable water tank. When you see water flow from the overflow port immediately stop the water supply.
- S 863-017-003
- (7) Move the handle for the WATER SYSTEM FILL/DRAIN VALVE to the CLOSED position.
- S 863-018-003
- (8) Manually close the VENT/OVERFLOW VALVE.
- S 413-019-003
- (9) Install the aft right bulkhead lining in the bulk cargo compartment (AMM 25-52-01/401).
- S 413-020-003
- (10) Close the bulk cargo compartment door.
- S 093-021-003
- (11) Disconnect the water service cart as follows:
- (a) Disconnect the water supply hose from the WATER SYSTEM FILL/DRAIN PORT connection.

CAUTION: MAKE SURE THE AIRPLANE FILL LINE IS FULLY DRAINED BEFORE YOU CLOSE THE CAP FOR THE FILL CONNECTION. IF THE FILL LINE IS NOT FULLY DRAINED, THE LINE CAN FREEZE WHICH CAN RESULT IN DAMAGE TO THE WATER LINES OR CONNECTIONS.

- (b) Let the water fully drain from the WATER SYSTEM FILL/DRAIN PORT connection.
 - (c) Close the cap on the WATER SYSTEM FILL/DRAIN PORT connection.
 - (d) Close the door for the potable water service panel.
- S 863-022-003
- (12) If the circuit breakers were opened after the potable water system was drained, close these circuit breakers and remove the DO-NOT-CLOSE tags:
- (a) On the overhead panel, P11:
 - 1) 11U28, POT WATER PRESS
 - (b) On the forward miscellaneous electrical equipment panel, P33:
 - 1) 33H6, WATER SYS AIR CPRSR
 - (c) On the APU/EXT power panel, P34:
 - 1) 34P11, WATER QTY/PRESS
 - (d) On the left miscellaneous electrical equipment panel, P36:
 - 1) 36D6 or 36D7 or 36E7, WTR HTR LAV SYS 1

EFFECTIVITY
AIRPLANES WITH AFT FILL SERVICE PANEL
WITH ONE PORT (COMBINED FILL/DRAIN)

12-14-01
CONFIG 3
Page 306
Dec 22/06

01

- (e) On the right miscellaneous electrical equipment panel, P37:
1) 37H7 or 37E7, WTR HTR LAV SYS 2

TASK 12-14-01-683-023-003

3. Drain the Potable Water System (Fig. 301)

A. Equipment

- (1) Water Service Cart

B. References

- (1) AMM 06-46-00/201, Fuselage Access Doors and Panels
(2) AMM 24-22-00/201, Electric Power Control
(3) AMM 25-52-01/401, Cargo Compartment Sidewall
(4) AMM 52-36-00/001, Bulk Cargo Door
(5) AMM 52-49-00/001, External Service Door

C. Access

(1) Location Zones

- 124 Area Below Forward Cargo Compartment (Right)
155 Area Below Aft Cargo Compartment (Left)
166 Area Aft of Bulk Cargo Compartment (Right)

(2) Access Panel

- 124BL Potable Water Drain Panel (Forward)
155AL Potable Water Service Panel (Aft)

D. Drain the Potable Water Tank (When Electrical Power is Available)

S 683-024-003

WARNING: DRAIN, OR USE THE POTABLE WATER SYSTEM A MINIMUM OF ONE TIME EACH THREE DAYS. IF YOU DO NOT DRAIN, OR USE THE WATER SYSTEM FREQUENTLY, BACTERIA CAN GROW IN THE WATER. IF YOU DRINK WATER WITH BACTERIA IN IT, ILLNESS CAN OCCUR.

- (1) Obey this WARNING during all of this task.

S 863-025-003

- (2) Supply electrical power (AMM 24-22-00/201).

S 863-026-003

- (3) Make sure the shutoff valves for the lavatories and galleys are open.

EFFECTIVITY
AIRPLANES WITH AFT FILL SERVICE PANEL
WITH ONE PORT (COMBINED FILL/DRAIN)

12-14-01
CONFIG 3
Page 307
Dec 22/06

01

- S 863-056-003
- (4) If it is installed, open the drain valve to drain the water from each coffee maker or water boiler.

- S 013-027-003
- (5) Open the doors for the forward potable water drain panel and aft potable water service panel (AMM 52-49-00/001).

NOTE: This will cause the VENT/OVERFLOW valve to open.

- S 493-028-003
- (6) Connect a drain line to each WATER SYSTEM FILL/DRAIN PORT connection.

NOTE: On the aft potable water service panel this airplane has a common fill and drain fitting. It is necessary to use a clean, potable water-only drain line for this airplane.

- S 683-051-003
- (7) On the forward drain panel, move the handle for the WATER SYSTEM DRAIN VALVE to the OPEN position.

- S 683-029-003
- (8) On the aft service panel, move the handle for the WATER SYSTEM FILL/DRAIN VALVE to the OPEN position. This will open the water tank fill/drain valve.

- S 713-030-003
- (9) On the aft service panel, make sure the FILL/DRAIN INDICATOR LIGHT is on.

- S 863-031-003
- (10) When all the water has drained from the potable water system, move the handle (on the forward drain panel) for the WATER SYSTEM DRAIN VALVE to the CLOSED position.

- S 683-052-003
- (11) Move the handle (on the aft service panel) for the WATER SYSTEM FILL/DRAIN VALVE to the CLOSED position. This will close the water tank fill/drain valve.

- S 093-032-003
- (12) Disconnect the drain lines from the water drain connections.

- S 413-033-003
- (13) Close the doors for the forward potable water drain panel and the aft potable water service panel.

EFFECTIVITY
AIRPLANES WITH AFT FILL SERVICE PANEL
WITH ONE PORT (COMBINED FILL/DRAIN)

12-14-01
CONFIG 3
Page 308
Aug 22/08

02

S 863-034-003

- (14) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 863-035-003

- (15) If you do not fill the potable water tank immediately after it is drained; then, open these circuit breakers and attach DO-NOT-CLOSE tags:
- (a) On the overhead panel, P11:
 - 1) 11U28, POT WATER PRESS
 - (b) On the forward miscellaneous electrical equipment panel, P33:
 - 1) 33H6, WATER SYS AIR CPRSR
 - (c) On the APU/EXT power panel, P34:
 - 1) 34P11, WATER QTY/PRESS
 - (d) On the left miscellaneous electrical equipment panel, P36:
 - 1) 36E7, WTR HTR LAV SYS 1
 - (e) On the right miscellaneous electrical equipment panel, P37:
 - 1) 37E7, WTR HTR LAV SYS 2

E. Drain the Potable Water System (When Electrical Power is Not Available)

S 863-036-003

- (1) Make sure the shutoff valves for the lavatories and galleys are open.

S 013-037-003

- (2) Open the doors for the forward potable water drain panel and for the aft potable water service panel (AMM 52-49-00/001).

S 493-038-003

- (3) Connect a drain line to each water drain connection.

NOTE: For the aft service panel this airplane has a common fill and drain fitting. It is necessary to use a clean, potable water only drain line for this airplane.

S 683-039-003

- (4) On the forward panel, move the handle for the WATER SYSTEM DRAIN VALVE to OPEN.

S 683-050-003

- (5) On the aft panel, move the handle for the WATER SYSTEM FILL/DRAIN VALVE to OPEN.

S 013-040-003

- (6) Open the bulk cargo compartment door, 811 (AMM 52-36-00/001).

EFFECTIVITY
AIRPLANES WITH AFT FILL SERVICE PANEL
WITH ONE PORT (COMBINED FILL/DRAIN)

12-14-01

CONFIG 3

03

Page 309

Aug 22/08

- S 013-041-003
- (7) Remove the aft right bulkhead lining of the bulk cargo compartment (AMM 25-52-01/401).
- S 863-042-003
- (8) Manually open the VENT/OVERFLOW VALVE.
- NOTE:** Without electrical power the indicator light on the potable water service panel will not come on.
- S 863-043-003
- (9) Manually close the VENT/OVERFLOW VALVE.
- S 413-044-003
- (10) Install the aft right bulkhead lining in the bulk cargo compartment (AMM 25-52-01/401).
- S 413-045-003
- (11) Close the bulk cargo compartment door.
- S 863-046-003
- (12) On the aft service panel, move the handle for the WATER SYSTEM FILL/DRAIN VALVE to CLOSED.
- S 863-053-003
- (13) On the forward drain panel, move the handle for the WATER SYSTEM DRAIN VALVE to CLOSED.
- S 093-047-003
- (14) Disconnect the drain lines from the water drain connections.
- S 413-048-003
- (15) Close the doors for the forward potable water drain panel and for the aft potable water service panel.
- S 863-049-003
- (16) If you do not fill the potable water tank immediately after it is drained; then, open these circuit breakers and attach DO-NOT-CLOSE tags:
- (a) On the overhead panel, P11:
 - 1) 11U28, POT WATER PRESS
 - (b) On the forward miscellaneous electrical equipment panel, P33:
 - 1) 33H6, WATER SYS AIR CPRSR

EFFECTIVITY
AIRPLANES WITH AFT FILL SERVICE PANEL
WITH ONE PORT (COMBINED FILL/DRAIN)

12-14-01
CONFIG 3
Page 310
Dec 22/02

01

 **BOEING**
767
MAINTENANCE MANUAL

- (c) On the APU/EXT power panel, P34:
 - 1) 34P11, WATER QTY/PRESS
- (d) On the left miscellaneous electrical equipment panel, P36:
 - 1) 36E7, WTR HTR LAV SYS 1
- (e) On the right miscellaneous electrical equipment panel, P37:
 - 1) 37E7, WTR HTR LAV SYS 2

EFFECTIVITY
AIRPLANES WITH AFT FILL SERVICE PANEL
WITH ONE PORT (COMBINED FILL/DRAIN)

01

12-14-01
CONFIG 3
Page 311
Dec 22/06

MAIN GEAR SHOCK STRUT – SERVICING

1. General

A. This procedure contains these tasks:

- (1) To check the fluid levels of the MLG shock strut.
- (2) To fully service the MLG shock strut with fluid and nitrogen. This task also contains an alternative procedure to fill the shock strut with hydraulic fluid when the airplane is on the ground or on jacks.
- (3) To service the MLG shock strut when you need to add nitrogen only.

TASK 12-15-01-203-001

2. Examine the Fluid Level of the Shock Strut

A. General

- (1) This procedure supplies instructions to check the level of the hydraulic fluid in the shock strut of the main landing gear.
- (2) To do a check of the fluid level, you must measure the pressure and the extension of the shock strut twice, at two different shock strut extensions. The greater the difference between the shock strut extensions, the more accurate the fluid measurement will be.
 - (a) You can obtain the different shock strut extensions one of two ways:
 - 1) You can take the shock strut measurements at two different airplane weights, for example, before and after fueling the airplane, or,
 - 2) If the airplane is on jacks, you can use floor jacks or the airplane jacks to compress or extend the shock strut.
 - (b) You should have a difference of 2 - 4 inches (51 - 102 mm) between the two shock strut extensions to do the check.

B. Prepare to Check the Hydraulic Fluid Level

S 483-037

WARNING: MAKE SURE THE DOWNLOCKS ARE INSTALLED IN ALL OF THE LANDING GEAR. WITHOUT THE DOWNLOCKS, THE LANDING GEAR COULD RETRACT AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

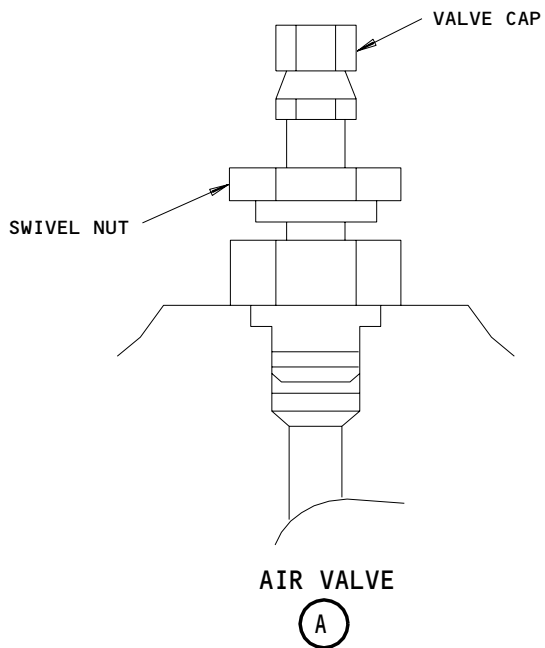
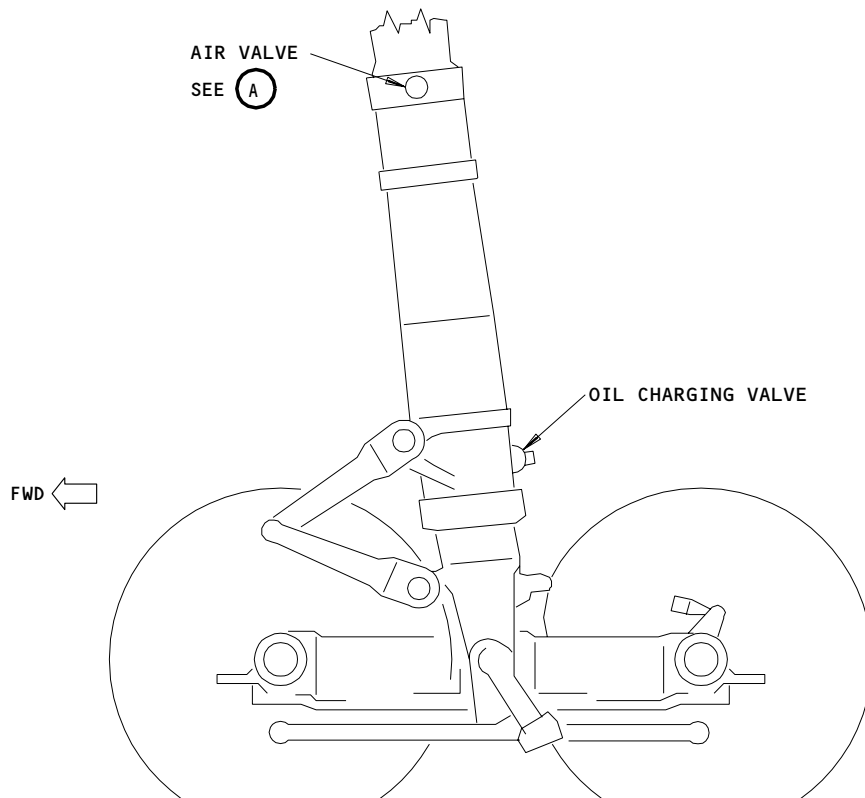
EFFECTIVITY

ALL

12-15-01

01

Page 301
Apr 22/02



Servicing of the Shock Strut for the Main Landing Gear
Figure 301

EFFECTIVITY	
	ALL

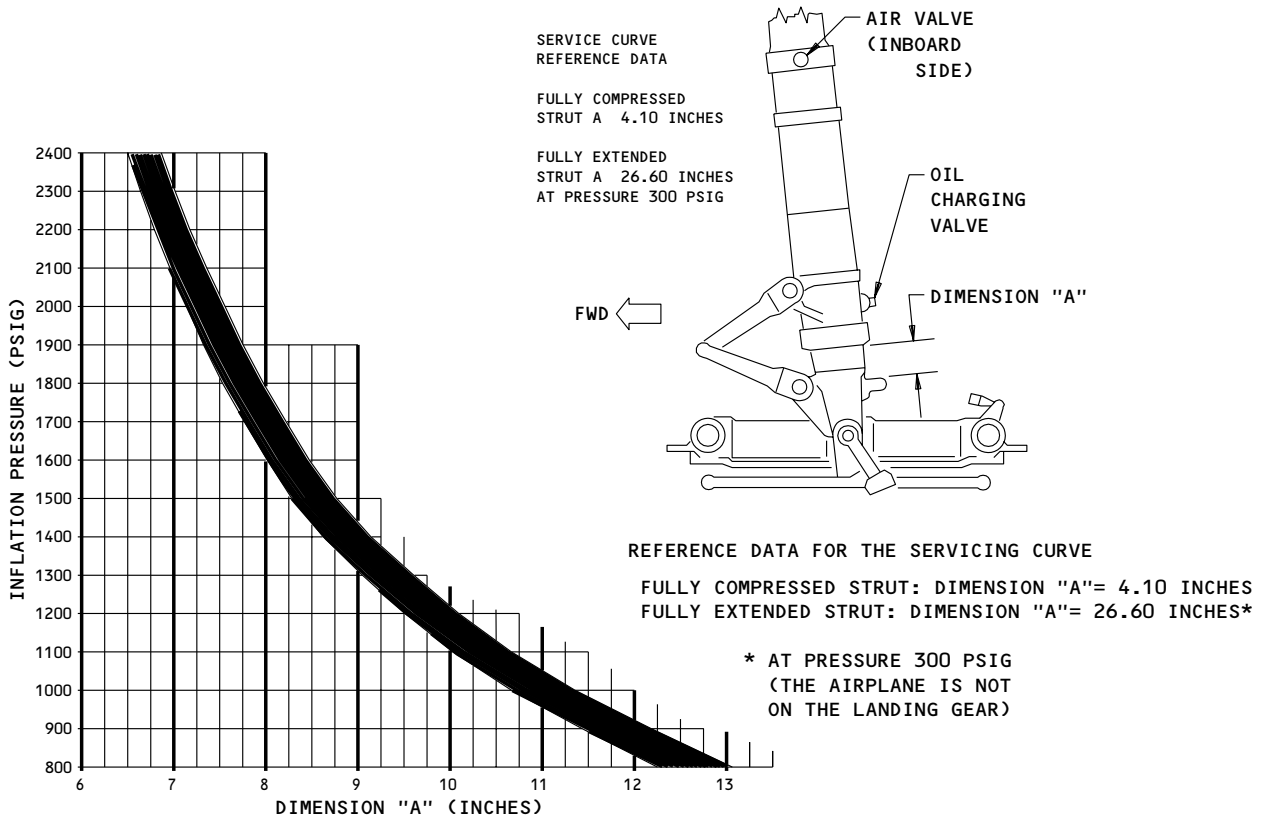
12-15-01

01

Page 302
Dec 10/98

21643

SERVICING CHART – MAIN LANDING GEAR SHOCK STRUT



OIL SERVICING INSTRUCTIONS

1. WITH THE SHOCK STRUT VERTICAL, OPEN THE AIR VALVE AND FULLY COMPRESS THE STRUT (DIMENSION "A"= 4.10). FILL THE SHOCK STRUT WITH THE OIL SPECIFIED ON THE NAMEPLATE. FILL UNTIL THE OIL COMES OUT OF THE AIR VALVE AND IS BUBBLE FREE.

AIR SERVICING INSTRUCTIONS

1. WITH THE AIRPLANE WEIGHT ON THE LANDING GEAR, USE DRY AIR OR NITROGEN TO INFLATE THE SHOCK STRUT. INFLATE THE SHOCK STRUT THROUGH THE AIR VALVE UNTIL DIMENSION "A" IS APPROXIMATELY 8.00 INCHES OR UNTIL YOU GET 2000 PSIG.
2. USE A PRESSURE GAGE TO MEASURE THE AIR PRESSURE.
3. ADD OR RELEASE THE DRY AIR OR NITROGEN TO GET THE CORRECT DIMENSION "A" FOR THE PRESSURE. THE DIMENSION "A" IS SHOWN ON THE CHART. 1

IMPORTANT

4. IF THE SHOCK STRUT WAS OVERHAULED OR THE FLUID WAS COMPLETELY REPLACED, AFTER 5-10 IN SERVICE LANDINGS DO THE AIR SERVICING AGAIN PER STEPS 2 AND 3.

1 DIMENSION "A" AND THE PRESSURE MUST BE ON THE SERVICING CURVE FOR A CORRECTLY SERVICED SHOCK STRUT.

Servicing for the Shock Strut of the Main Landing Gear
Figure 302

EFFECTIVITY

ALL

12-15-01

01

Page 303
Apr 22/08

S 493-025

WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).
- C. Check the hydraulic fluid level of the shock strut for the main landing gear:

S 223-002

- (1) Check the hydraulic fluid level with the airplane at the first shock strut extension:
 - (a) Remove the cap from the air valve.
 - (b) Install a pressure gage on the shock strut to measure the pressure. Use the instructions supplied with the tool.

WARNING: LOOSEN THE NUT FOR THE AIR VALVE A MAXIMUM OF TWO TURNS. DO NOT REMOVE THE VALVE BODY ON A PRESSURIZED STRUT. AIR PRESSURE CAN BLOW THE VALVE OUT AND INJURE PERSONNEL.

- (c) Loosen the swivel nut for the air valve two turns and measure the pressure of the shock strut.
- (d) Measure the actual "A" dimension on the strut as shown on Fig. 302.
- (e) Use the chart on Fig. 302 to find the "A" dimension that corresponds to the pressure you measured.
- (f) Compare the "A" dimension from the chart to the "A" dimension that you actually measured.
- (g) If the actual measured "A" dimension is within the upper and lower limits of the "A" dimension from the chart, then do the steps for a pressure check at the second point.
- (h) If the actual measured "A" dimension is not within the upper and lower limits of the "A" dimension from the chart, then do the Nitrogen Servicing Only to get the measured "A" dimension within the limits. Then do the steps for a pressure check at the second point.

EFFECTIVITY

ALL

12-15-01

01

Page 304
Apr 22/00

S 223-042

- (2) Check the hydraulic fluid level with the airplane at the second shock strut extension:

NOTE: To get a different shock strut extension, you can have the airplane at a different weight, or, if the airplane is lifted on jacks, you can use the airplane jacks or floor jacks to compress or extend the shock strut.

You should have a minimum difference of 2 - 4 inches between the two shock strut extensions to do the check.

- (a) Remove the cap from the air valve.
- (b) Install a pressure gage on the shock strut to measure the pressure. Use the instructions supplied with the tool.

WARNING: LOOSEN THE NUT FOR THE AIR VALVE A MAXIMUM OF TWO TURNS. DO NOT REMOVE THE VALVE BODY ON A PRESSURIZED STRUT. AIR PRESSURE CAN BLOW THE VALVE OUT AND INJURE PERSONNEL.

- (c) Loosen the swivel nut for the air valve two turns and measure the pressure of the shock strut.
- (d) Measure the actual "A" dimension on the strut as shown on Fig. 302.
- (e) Use the chart on Fig. 302 to find the "A" dimension that corresponds to the pressure you measured.
- (f) Compare the "A" dimension from the chart to the "A" dimension that you actually measured.

NOTE: When servicing the strut to the servicing chart, it is recommended that the intersection of your dimension and pressure values be at the center of the width of the servicing band. This practice will result in a more accurate assessment of the fluid level.

- (g) If the actual measured "A" dimension is within the upper and lower limits of the "A" dimension from the chart, then do these steps to complete the check:
 - 1) Tighten the swivel nut to 5 - 7 pound-feet to close the air valve.
 - 2) Remove the pressure gage from the shock strut.
 - 3) Install the cap for the air valve.
- (h) If the actual measured "A" dimension is not within the upper and lower limits of the "A" dimension from the chart, then do the Fluid and Nitrogen Servicing to adjust the fluid level.

NOTE: If only one of the two pressure checks is satisfactory, then the fluid volume is not correct.

- (i) Tighten the swivel nut to 5 - 7 pound-feet to close the air valve.
- (j) Remove the pressure gage from the shock strut.

EFFECTIVITY

ALL

12-15-01

01

Page 305
Apr 22/00

(k) Install the cap on the air valve.

TASK 12-15-01-603-004

3. Servicing of the Shock Strut for the Main Landing Gear

NOTE: Use this procedure for the usual servicing and checks of the shock struts. A fully serviced shock strut will contain approximately 38.1 quarts (36.0 liters) of shock strut fluid.

A. General

(1) This task services the shock strut for the main landing gear.

B. Equipment

- (1) Strut Inflation Tool - F70200-14
- (2) Drain Bucket - Commercially Available
- (3) Hose to Strut Air Valve -
(Commercially Available)
- (4) Dry Air or Nitrogen Bottle, charged to 3000 psi
- Commercially Available
- (5) PF55451-23 - Servicing Cart, Malabar Hydraulics
(Commercially Available)
- (6) Pressure Gage, 800 to 2500 PSIG - Commercially Available.

C. Consumable Materials

NOTE: Refer to AMM 12-15-11-301 for proper usage of fluids and for alternative fluids.

- (1) D00467 Fluid - Hydraulic, BMS 3-32 (Recommended)

Type I - Royco SSF, Shell SSF and Castrolaero 35 (These fluids contain the mixture of MIL-H-6083 and Lubrizol 1395)

Type II - Royco LGF, Shell LGF and Castrolaero 40 (These fluids are the recommended fluid for servicing and contain the mixture of MIL-H-5606 and Lubrizol 1395)

NOTE: Type I is the recommended fluid to use when refilling a strut after overhaul.

- (2) D00508 MIL-H-5606 Hydraulic Fluid (Alternative)

NOTE: This oil is the recommended fluid for servicing of the shock strut. For servicing, mix MIL-H-5606 in the correct proportion (41:1) with Lubrizol 1395 before you fill the shock strut.

- (3) D00510 Lubrizol 1395

EFFECTIVITY

ALL

12-15-01

01

Page 306
Aug 22/04

SAS
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SAS
SAS
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- (4) RMC 481-026-XX SHELL Landing Gear Fluid (SHELL LGF)

NOTE: RMC 481-026-XX is the preferred fluid and fully mixable with the other fluids which is optional.

- (5) D00509 MIL-H-6083 Hydraulic Fluid (alternative)

NOTE: You can use this fluid with MIL-H-5606 and you can use it as an alternative for MIL-H-5606. For servicing, mix MIL-H-6083 in the correct proportion (41:1) with Lubrizol 1395 before you fill the shock strut.

D. References

- (1) AMM 12-15-11/301, Landing Gear Shock Strut Fluids
(2) AMM 32-00-15/201, Landing Gear Door Locks
(3) AMM 32-00-20/201, Landing Gear Downlocks

E. Access

- (1) Location Zones
731/741 Main Landing Gear

F. Prepare to Do the Servicing of the Shock Strut

S 483-038

WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 493-043

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 863-007

WARNING: CLEAR THE AREA BELOW THE WING BEFORE YOU DEFLATE THE SHOCK STRUT. IF YOU DEFLATE ONE SHOCK STRUT, THE WING TIP CAN MOVE DOWN AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Deflate the shock strut of the main landing gear (Fig. 301):
(a) Remove the cap from the air valve (Detail A).

EFFECTIVITY

ALL

12-15-01

SAS

Page 307
Aug 22/04

WARNING: LOOSEN THE NUT FOR THE AIR VALVE A MAXIMUM OF TWO TURNS. AIR PRESSURE CAN BLOW THE VALVE OFF AND CAN CAUSE INJURY TO PERSONS.

- (b) Loosen the nut for the air valve.
- (c) Let the shock strut deflate completely.

NOTE: The shock strut is fully deflated when the dimension "A" is 4.1 inches (Fig. 302).

G. Servicing of the Shock Strut

S 033-008

- (1) Loosen the nut for the air valve to fully open the valve.

S 613-009

CAUTION: OBEY THE INSTRUCTIONS IN AMM 12-15-11/301 WHEN YOU ADD FLUID TO FILL THE SHOCK STRUT. IF AN INCORRECT FLUID IS USED, IT CAN CAUSE DAMAGE TO THE SEALS.

- (2) To fill the MLG shock strut with hydraulic fluid, do one of the procedures that follow:
 - (a) Recommended steps to fill the MLG shock strut with hydraulic fluid (Airplane on ground or on jacks):

WARNING: WHEN YOU COMPRESS THE SHOCK STRUT WITH AXLE JACKS, MAKE SURE YOU DO NOT LIFT THE AIRPLANE OFF OF THE AIRPLANE JACKS. IF THE AIRPLANE IS NOT ON THE AIRPLANE JACKS IT MAY FALL AND CAUSE DAMAGE TO EQUIPMENT AND INJURY TO PERSONS.

- 1) If the airplane is on jacks, do this step:
Use the axle jacks to fully compress the shock strut.

NOTE: The strut is fully compressed when the dimension "A" is 4.1 inches.

EFFECTIVITY

ALL

12-15-01

01

Page 308
Aug 22/04

- 2) Remove the cap for the pressure seal from the oil charging valve.
- 3) Attach an oil charging line to the oil charging valve.
- 4) Make sure the air valve is fully open.
- 5) Attach one end of a hose to the air valve.
- 6) Put the other end of the hose in a drain bucket.

CAUTION: DO NOT LET HYDRAULIC FLUID GET ON THE TIRES.
IMMEDIATELY CLEAN ALL FLUID FROM THE TIRES. THE
FLUID CAN CAUSE DAMAGE TO THE TIRES.

- 7) Fill the shock strut with hydraulic fluid until the hydraulic fluid flows into the drain bucket.
 - a) Continue to fill the shock strut until the hydraulic fluid which flows into the bucket is free of bubbles.
 - 8) Remove the oil charging line.
 - 9) Put the cap on for the pressure seal.
 - 10) Remove the hose from the air valve.
 - 11) If the airplane is on jacks, then remove the axle jacks.
- (b) Alternative steps to fill the MLG shock strut with hydraulic fluid (Airplane on Ground):
- 1) Make sure the strut is fully deflated.
 - 2) Remove the cap for the pressure seal from the oil charging valve.
 - 3) Attach an oil charging line to the oil charging valve.
 - 4) Make sure the air valve is fully open.
 - 5) Attach one end of a hose to the air valve.
 - 6) Put the other end of the hose in a drain bucket.

CAUTION: DO NOT LET HYDRAULIC FLUID GET ON THE TIRES.
IMMEDIATELY CLEAN ALL FLUID FROM THE TIRES. THE
FLUID CAN CAUSE DAMAGE TO THE TIRES.

- 7) Fill the shock strut with hydraulic fluid until the hydraulic fluid flows into the drain bucket.
 - a) Continue to fill the shock strut until the hydraulic fluid which flows into the bucket is free of bubbles.
- 8) Close the air valve.

CAUTION: DO NOT LET HYDRAULIC FLUID GET ON THE TIRES.
IMMEDIATELY CLEAN ALL FLUID FROM THE TIRES. THE
FLUID CAN CAUSE DAMAGE TO THE TIRES.

- 9) Inflate the shock strut with hydraulic fluid until dimension "A" equals 6.0 to 8.0 inches.
- 10) Attach one end of a hose to the air valve.
- 11) Put the other end of the hose in a drain bucket.

EFFECTIVITY

ALL

12-15-01

01

Page 309
Aug 22/02

WARNING: LOOSEN THE NUT FOR THE AIR VALVE A MAXIMUM OF TWO TURNS. AIR PRESSURE CAN BLOW THE VALVE OFF AND CAN CAUSE INJURY TO PERSONS.

CAUTION: DO NOT LET HYDRAULIC FLUID GET ON THE TIRES. IMMEDIATELY CLEAN ALL FLUID FROM THE TIRES. THE FLUID CAN CAUSE DAMAGE TO THE TIRES.

12) Slowly loosen the nut for the air valve to release the excess fluid.

NOTE: The fluid is under pressure and opening the valve quickly may cause the hose to disconnect or fluid to overrun the bucket.

13) Let the shock strut fully deflate.

NOTE: The shock strut is fully deflated when the dimension "A" is 4.1 inches.

14) During the last one inch of strut compression, make sure you do not see bubbles in the fluid that flows into the bucket.

NOTE: If bubbles are visible then do this task again.

15) When the strut is fully compressed, open the air valve fully to ensure all pressure is removed.

16) Remove the oil charging line.

17) Put the cap on for the pressure seal.

18) Remove the hose from the air valve.

(c) Alternative steps to fill the MLG shock strut with hydraulic fluid (Airplane on jacks):

1) Make sure dimension "A" is 6.0 to 8.0 inches.

NOTE: Use axle jacks to compress the shock strut.

2) Attach an oil charging line to the oil charging valve.

3) Make sure the air valve is fully open.

4) Attach one end of a hose to the air valve.

5) Put the other end of the hose in a drain bucket.

CAUTION: DO NOT LET HYDRAULIC FLUID GET ON THE TIRES. IMMEDIATELY CLEAN ALL FLUID FROM THE TIRES. THE FLUID CAN CAUSE DAMAGE TO THE TIRES.

6) Fill the shock strut with hydraulic fluid until the hydraulic fluid that flows into the bucket is free of bubbles.

7) Remove the oil charging line.

EFFECTIVITY

ALL

12-15-01

01

Page 310
Apr 22/02

8) Put the cap on for the pressure seal.

WARNING: WHEN YOU COMPRESS THE SHOCK STRUT WITH AXLE JACKS, MAKE SURE YOU DO NOT LIFT THE AIRPLANE OFF OF THE AIRPLANE JACKS. IF THE AIRPLANE IS NOT ON THE AIRPLANE JACKS IT MAY FALL AND CAUSE DAMAGE TO EQUIPMENT AND INJURY TO PERSONS.

9) Use axle jacks to fully compress the shock strut.

NOTE: The strut is fully compressed when the dimension "A" is 4.1 inches.

10) Remove the hose from the air valve.

11) Remove the axle jacks.

S 863-010

(3) To inflate the MLG shock strut, do one of the procedures that follow:

(a) Do the steps that follow to inflate the MLG shock strut: (Airplane on the ground)

1) Install the inflation tool on the air valve. Use the instructions supplied with the tool.

2) Use dry air or nitrogen to inflate the shock strut until dimension "A" is approximately 8 inches or 2000 psig (Fig. 302).

3) Use a pressure gage to measure the pressure of the shock strut.

4) Add or release the dry air or nitrogen, until the measured pressure is in the range shown on the servicing chart.

NOTE: The values for Dimension "A" and the pressure must intersect on the servicing curve for a correctly serviced shock strut.

5) Remove the inflation tool from the air valve.

6) Tighten the swivel nut to 5-7 pound-feet (Detail A, Fig. 301).

7) Put the cap on the air valve.

(b) Do the steps that follow to inflate the MLG shock strut: (Airplane on jacks)

1) Lift the airplane to extend the shock strut fully (AMM 07-11-01/201).

2) Install the inflation tool on the air valve. Use the instructions supplied with the tool.

EFFECTIVITY

ALL

12-15-01

01

Page 311
Aug 22/04

- 3) Add or release dry air or Nitrogen to service the fully extended shock strut at 300 psig.

NOTE: Do not add hydraulic fluid when the airplane weight is not on the landing gear. When you service the landing gear with dry air or Nitrogen, it is not necessary to service the landing gear again when it is lowered and the jacks are removed. A fully serviced shock strut is also necessary before you do the extension and retraction test.

- 4) Remove the inflation tool from the air valve.
- 5) Tighten the swivel nut to 5-7 pound-feet (Detail A, Fig. 301).
- 6) Put the cap on the air valve.

S 973-044

CAUTION: SHOCK STRUT FLUID CAN ABSORB NITROGEN OR AIR AFTER A COMPLETE SERVICING. THIS WILL REDUCE THE PRESSURE IN THE SHOCK STRUT, WHICH CAN CAUSE DAMAGE TO EQUIPMENT.

- (4) If the shock strut was overhauled, the fluid was completely replaced or the shock strut was completely deflated, then after 5-10 in-service landings you must do the task "Service the Shock Strut with Nitrogen Only"
- H. Put the Airplane Back to Its Usual Condition

S 083-036

WARNING: OBEY THE REMOVAL PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Remove the door locks and close the doors (AMM 32-00-15/201).

TASK 12-15-01-603-045

4. Servicing of the Shock Strut with Nitrogen Only

A. Equipment

- (1) Strut Inflation Tool - F70200-14
- (2) Pressure Gage, 800 to 2500 PSIG - Commercially Available.

B. Consumable Materials

- (1) Dry Nitrogen (Recommended), 3000 psi (Commercially Available)
- (2) Dry Air (Alternative), 3000 psi (Commercially Available)

C. Access

- (1) Location Zones
731/741 Main Landing Gear

D. Prepare to Do the Servicing of the Shock Strut

EFFECTIVITY

ALL

12-15-01

02

Page 312
Apr 22/08

S 423-049

WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 423-050

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

E. Service the Shock Strut with Nitrogen Only

S 023-051

- (1) Remove the cap from the air valve.

S 483-052

- (2) Install the inflation tool on the air valve.

NOTE: Use the instructions supplied with the tool.

S 023-053

WARNING: LOOSEN THE NUT FOR THE AIR VALVE A MAXIMUM OF TWO TURNS. DO NOT REMOVE THE VALVE BODY ON A PRESSURIZED STRUT. AIR PRESSURE CAN BLOW THE VALVE OUT AND INJURE PERSONNEL.

- (3) Loosen the swivel nut for the air valve two turns.

S 223-054

- (4) Use the pressure gage to measure the pressure of the shock strut.

S 223-055

- (5) Measure the actual "A" dimension on the strut (Fig. 302).

S 223-056

- (6) Use the chart on Fig. 302 to find the "A" dimension that corresponds to the pressure you measured.

S 223-057

- (7) Compare the "A" dimension from the chart to the "A" dimension that you actually measured.

EFFECTIVITY

ALL

12-15-01

02

Page 313
Apr 22/08

S 423-058

- (8) If the actual measured "A" dimension is not within the upper and lower limits of the "A" dimension from the chart, then do the step that follows:
- (a) Add or release the nitrogen until you get the "A" dimension for the pressure measured.

S 423-059

- (9) Tighten the swivel nut to 5 - 7 pound-feet to close the air valve.

S 083-060

- (10) Remove the inflation tool from the air valve.

S 423-061

- (11) Install the cap on the air valve.

F. Put the Airplane Back to Its Usual Condition

S 413-062

WARNING: OBEY THE REMOVAL PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Remove the door locks and close the doors (AMM 32-00-15/201).

EFFECTIVITY

ALL

12-15-01

02

Page 314
Apr 22/02

NOSE GEAR SHOCK STRUT – SERVICING

1. General

- A. This procedure contains three tasks. The first task does a check of the fluid levels for the shock strut of the nose landing gear. The second task does the servicing of the shock strut for the nose landing gear. The third task does the servicing of the shock strut with nitrogen only.

TASK 12-15-02-203-039

2. Examine the Fluid Level of the Shock Strut

A. General

- (1) This procedure supplies instructions to check the level of the hydraulic fluid in the shock strut of the nose landing gear.
- (2) To do a check of the fluid level, you must measure the pressure and the extension of the shock strut twice, at two different shock strut extensions. The greater the difference between the shock strut extensions, the more accurate the fluid measurement will be.
 - (a) You can obtain the different shock strut extensions on of two ways:
 - 1) You can take the shock strut measurements at two different airplane weights, for example, before and after fueling the airplane, or,
 - 2) If the airplane is on jacks, you can use floor jacks or the airplane jacks to compress or extend the shock strut.
 - (b) You should have a difference of 2 - 4 inches (51 - 102 mm) between the two shock strut extensions to do the check.

B. Prepare to Check the Hydraulic Fluid Level

S 483-040

WARNING: MAKE SURE THE DOWNLOCKS ARE INSTALLED IN ALL OF THE LANDING GEAR. WITHOUT THE DOWNLOCKS, THE LANDING GEAR COULD RETRACT AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

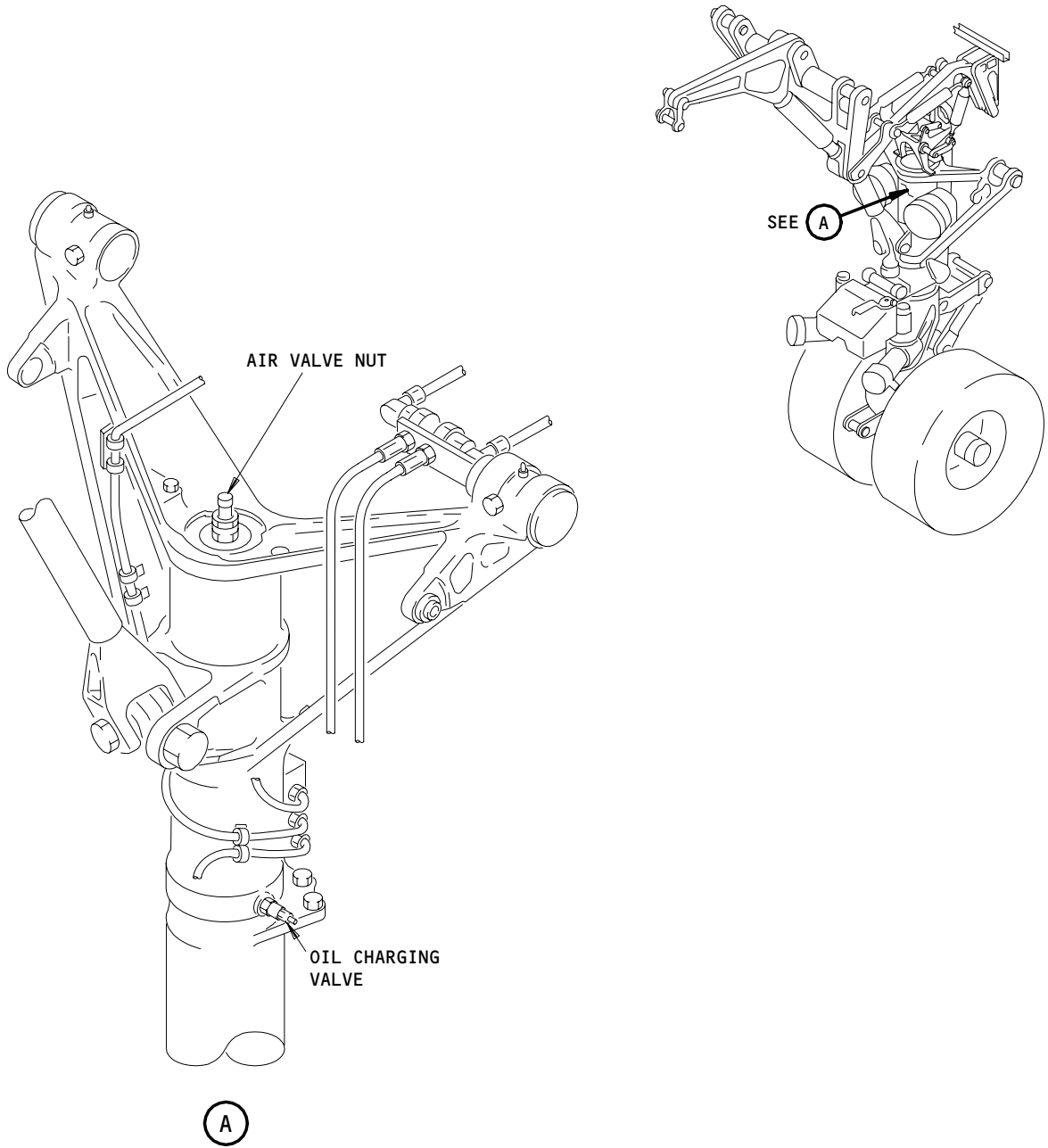
EFFECTIVITY

ALL

12-15-02

01

Page 301
Apr 22/02



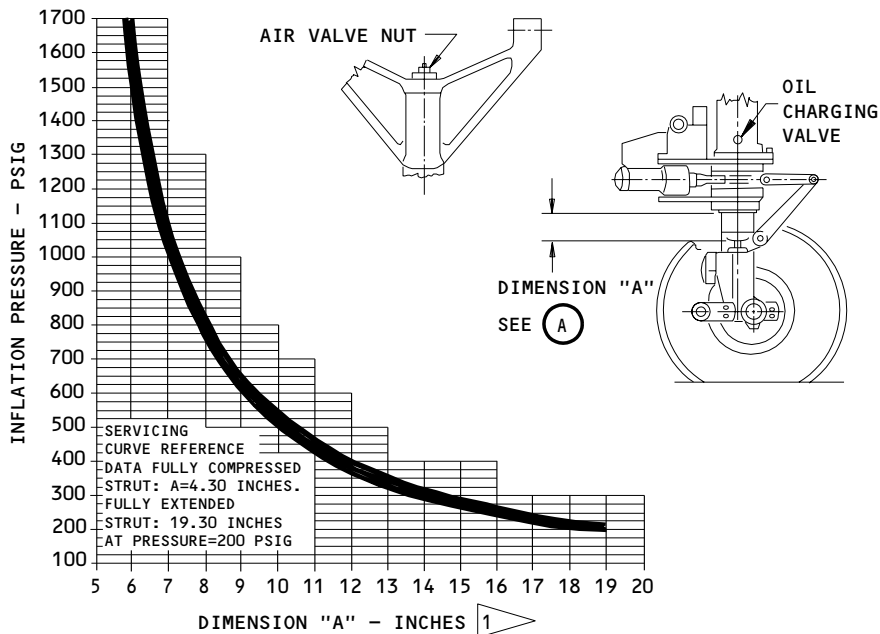
Servicing of the Shock Strut for the Nose Landing Gear
Figure 301

EFFECTIVITY	
	ALL

12-15-02

01

Page 302
Aug 10/90



REFERENCE DATA FOR THE SERVICING CURVE

FULLY COMPRESSED STRUT: DIMENSION "A"= 4.30 INCHES
 FULLY EXTENDED STRUT: DIMENSION "A"= 19.30 INCHES*

* AT PRESSURE 200 PSIG (THE AIRPLANE IS NOT ON THE LANDING GEAR)

OIL SERVICING INSTRUCTIONS

1. WITH THE SHOCK STRUT VERTICAL, OPEN THE AIR VALVE AND FULLY COMPRESS THE STRUT (DIMENSION "A"= 4.30). FILL THE SHOCK STRUT WITH THE OIL SPECIFIED ON THE NAMEPLATE. FILL UNTIL THE OIL COMES OUT OF THE AIR VALVE AND IS FREE OF BUBBLES.

AIR SERVICING INSTRUCTIONS

1. WITH THE AIRPLANE WEIGHT ON THE LANDING GEAR, USE DRY AIR OR NITROGEN TO INFLATE THE SHOCK STRUT. INFLATE THE SHOCK STRUT THROUGH THE AIR VALVE UNTIL DIMENSION "A" IS APPROXIMATELY 8.00 INCHES OR 800 PSIG.
2. USE A PRESSURE GAGE TO MEASURE THE AIR PRESSURE.
3. ADD OR RELEASE THE DRY AIR OR NITROGEN TO GET THE CORRECT DIMENSION "A" FOR THE PRESSURE. THE DIMENSION "A" IS SHOWN ON THE CHART. 2

IMPORTANT

4. IF THE SHOCK STRUT WAS OVERHAULED OR THE FLUID WAS COMPLETELY REPLACED, AFTER 5-10 IN SERVICE LANDINGS DO THE AIR SERVICING AGAIN PER STEPS 2 AND 3.

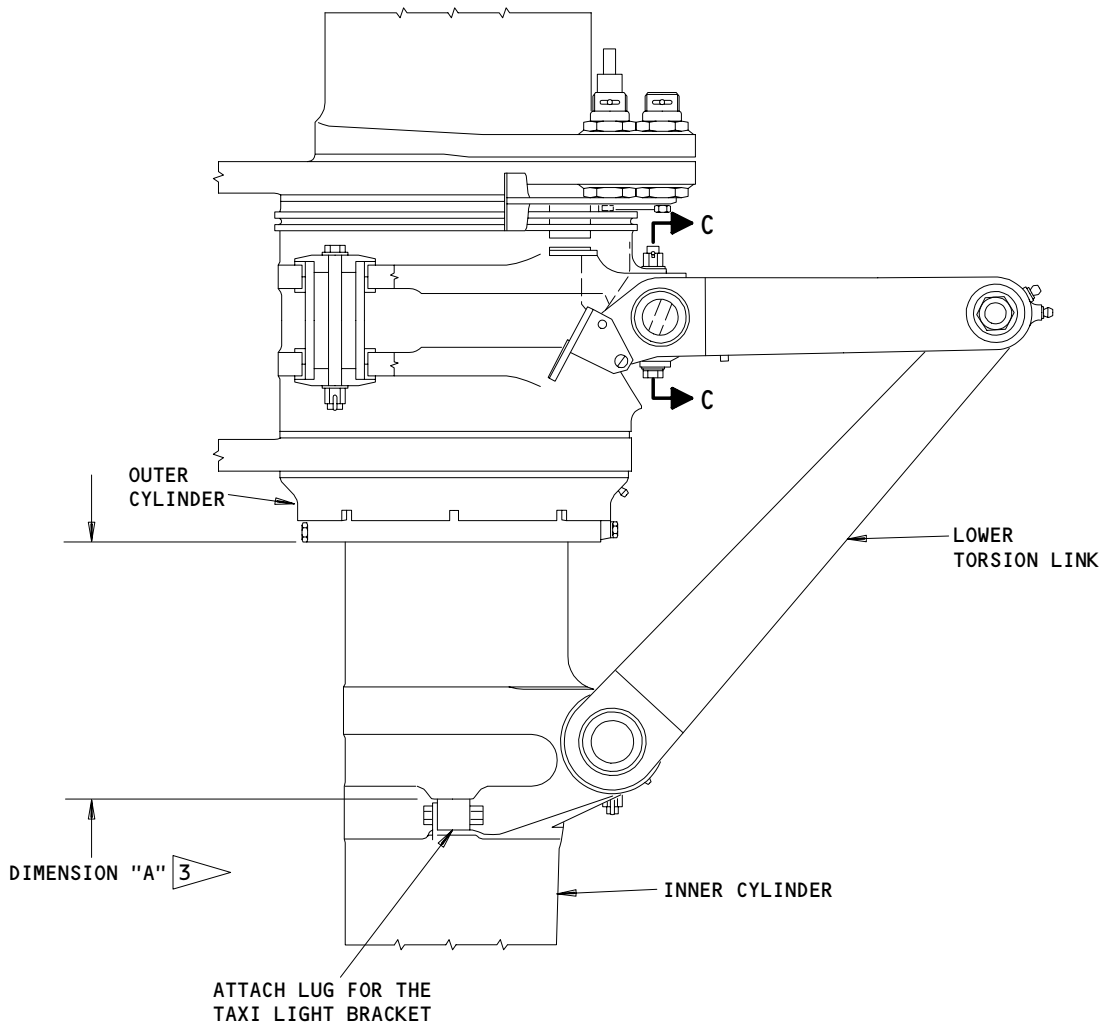
1 DIMENSION "A" MEASUREMENTS ARE USED TO DETERMINE SHOCK STRUT EXTENSION REQUIREMENTS TO DO THE SERVICING.

2 DIMENSION "A" AND THE PRESSURE MUST BE ON THE SERVICING CURVE FOR A CORRECTLY SERVICED SHOCK STRUT

Servicing Chart for the Shock Strut of the Nose Landing Gear
Figure 302 (Sheet 1)

EFFECTIVITY
 PREFERRED SERVICING CHART:
 ALL AIRPLANES

12-15-02



DIMENSION "A" MEASUREMENT

(A)

3 DIMENSION "A" IS MEASURED FROM THE LOWER EDGE OF THE OUTER CYLINDER TO THE UPPER EDGE OF THE ATTACH LUG FOR THE TAXI LIGHT BRACKET ON THE INNER CYLINDER.

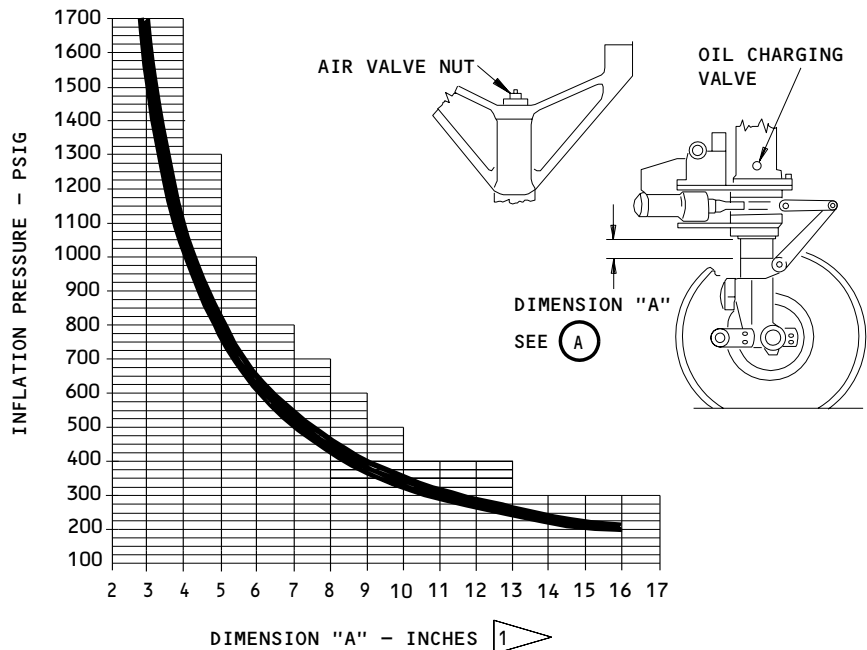
Servicing Chart for the Shock Strut of the Nose Landing Gear
Figure 302 (Sheet 2)

EFFECTIVITY	ALL
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12-15-02

05

Page 304
Aug 10/90



REFERENCE DATA FOR THE SERVICING CURVE

FULLY COMPRESSED STRUT: DIMENSION "A"= 1.20 INCHES
FULLY EXTENDED STRUT: DIMENSION "A"= 16.20 INCHES*

* AT PRESSURE 200 PSIG (THE AIRPLANE IS NOT ON THE LANDING GEAR)

OIL SERVICING INSTRUCTIONS

1. WITH THE SHOCK STRUT VERTICAL, OPEN THE AIR VALVE AND FULLY COMPRESS THE STRUT (DIMENSION "A"= 1.20). FILL THE SHOCK STRUT WITH THE OIL SPECIFIED ON THE NAMEPLATE. FILL UNTIL THE OIL COMES OUT OF THE AIR VALVE AND IS FREE OF BUBBLES.

AIR SERVICING INSTRUCTIONS

1. WITH THE AIRPLANE WEIGHT ON THE LANDING GEAR, USE DRY AIR OR NITROGEN TO INFLATE THE SHOCK STRUT. INFLATE THE SHOCK STRUT THROUGH THE AIR VALVE UNTIL THE DIMENSION "A" IS APPROXIMATELY 5.00 INCHES OR 800 PSIG.
2. USE A PRESSURE GAGE TO MEASURE THE AIR PRESSURE.
3. ADD OR RELEASE THE DRY AIR OR NITROGEN TO GET THE CORRECT DIMENSION "A" FOR THE PRESSURE. DIMENSION "A" IS SHOWN ON THE CHART. 2

IMPORTANT

4. IF THE SHOCK STRUT WAS OVERHAULED OR THE FLUID WAS COMPLETELY REPLACED, AFTER 5-10 IN SERVICE LANDINGS DO THE AIR SERVICING AGAIN PER STEPS 2 AND 3.

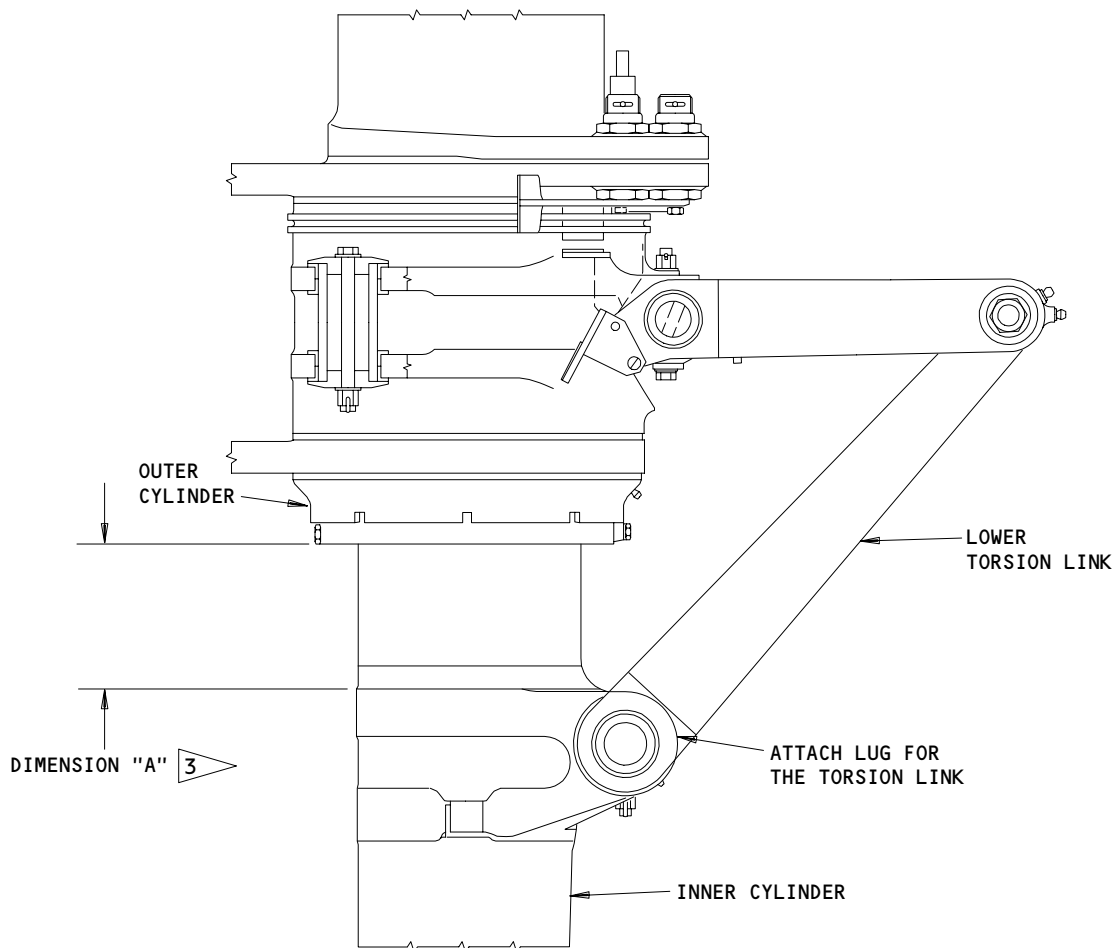
1 DIMENSION "A" MEASUREMENTS ARE USED TO DETERMINE SHOCK STRUT EXTENSION REQUIREMENTS FOR SERVICING.

2 DIMENSION "A" AND THE PRESSURE MUST BE ON THE SERVICING CURVE FOR A CORRECTLY SERVICED SHOCK STRUT

Servicing Chart for the Shock Strut of the Nose Landing Gear
Figure 303 (Sheet 1)

EFFECTIVITY
OPTIONAL SERVICING CHART:
ONLY 767-200 AIRPLANES

12-15-02



DIMENSION "A" MEASUREMENT

(A)

3 DIMENSION "A" IS MEASURED FROM THE LOWER EDGE OF THE OUTER CYLINDER TO THE UPPER SURFACE OF THE ATTACH LUG FOR THE TORSION LINK ON THE INNER CYLINDER.

Servicing Chart for the Shock Strut of the Nose Landing Gear
Figure 303 (Sheet 2)

EFFECTIVITY
OPTIONAL SERVICING CHART:
ONLY 767-200 AIRPLANES

12-15-02

S 483-041

WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).
- C. Check the hydraulic fluid level of the shock strut for the nose landing gear:

S 863-024

- (1) To open the forward doors of the nose landing gear, release the lock on rod 2 of the operating mechanism.

S 223-037

- (2) Check the hydraulic fluid level with the airplane at the first shock strut extension:
 - (a) Remove the cap from the air valve.
 - (b) Install a pressure gage on the shock strut to measure the pressure. Use the instructions supplied with the tool.

WARNING: LOOSEN THE NUT FOR THE AIR VALVE A MAXIMUM OF TWO TURNS. DO NOT REMOVE THE VALVE BODY ON A PRESSURIZED STRUT. AIR PRESSURE CAN BLOW THE VALVE OUT AND INJURE PERSONNEL.

- (c) Loosen the swivel nut for the air valve two turns and measure the pressure of the shock strut.
- (d) Measure the actual "A" dimension on the strut as shown on the servicing chart.
- (e) Use the servicing chart to find the "A" dimension that corresponds to the pressure you measured.

NOTE: Service placard BAC27TLG0007 is preferred for all 767-200 airplanes and required for all 767-300/400 airplanes. Service Placard BAC27TLG0002 is optional for 767-200 airplanes only.

- (f) Compare the "A" dimension from the chart to the "A" dimension that you actually measured.
- (g) If the actual measured "A" dimension is within the upper and lower limits of the "A" dimension from the chart, then do the steps for a pressure check at the second point.

EFFECTIVITY

ALL

12-15-02

03

Page 307
Dec 22/07

- (h) If the actual measured "A" dimension is not within the upper and lower limits of the "A" dimension from the chart, then do the Nitrogen Servicing Only to get the measured "A" dimension within the limits. Then do the steps for a pressure check at the second point.

S 223-038

- (3) Check the hydraulic fluid level with the airplane at the second shock strut extension:

NOTE: To get a different shock strut extension, you can have the airplane at a different weight, or, if the airplane is lifted on jacks, you can use the airplane jacks or floor jacks to compress or extend the shock strut.

You should have a minimum difference of 2 - 4 inches between the two shock strut extensions to do the check.

- (a) Remove the cap from the air valve.
- (b) Install a pressure gage on the shock strut to measure the pressure. Use the instructions supplied with the tool.

WARNING: LOOSEN THE NUT FOR THE AIR VALVE A MAXIMUM OF TWO TURNS. DO NOT REMOVE THE VALVE BODY ON A PRESSURIZED STRUT. AIR PRESSURE CAN BLOW THE VALVE OUT AND INJURE PERSONNEL.

- (c) Loosen the swivel nut for the air valve two turns and measure the pressure of the shock strut.
- (d) Measure the actual "A" dimension on the strut as shown in the servicing chart.
- (e) Use the servicing chart to find the "A" dimension that corresponds to the pressure you measured.
- (f) Compare the "A" dimension from the chart to the "A" dimension that you actually measured.

NOTE: When servicing the strut to the servicing chart, it is recommended that the intersection of your dimension and pressure values be at the center of the width of the servicing band. This practice will result in a more accurate assessment of the fluid level.

- (g) If the actual measured "A" dimension is within the upper and lower limits of the "A" dimension from the chart, then do these steps to complete the check:
 - 1) Tighten the swivel nut to close the air valve.
 - 2) Remove the pressure gage from the shock strut.
 - 3) Install the cap for the air valve.

EFFECTIVITY

ALL

12-15-02

01

Page 308
Apr 22/01

- (h) If the actual measured "A" dimension is not within the upper and lower limits of the "A" dimension from the chart, then do the Fluid and Nitrogen Servicing to adjust the fluid level.

NOTE: If only one of the two pressure checks is satisfactory, then the fluid volume is not correct.

- (i) Tighten the swivel nut to close the air valve.
- (j) Remove the pressure gage from the shock strut.
- (k) Install the cap on the air valve.
 - 1) Use oil and air to do the servicing of the shock strut.

TASK 12-15-02-603-004

3. Servicing of the Shock Strut for the Nose Landing Gear

NOTE: Use this procedure for the usual servicing and checks of the shock strut. A fully serviced shock strut will contain approximately 12.4 quarts (11.7 liters) of shock strut fluid.

A. General

- (1) This task services the shock strut for the nose landing gear.

B. Equipment

- (1) Strut Inflation Tool - F70200-14
- (2) Drain Bucket - Commercially Available
- (3) Hose to Strut Air Valve
(Commercially Available)
- (4) Dry Air or Nitrogen Bottle, charged to 2000 psi
- Commercially Available
- (5) PF55451-23 - Servicing Cart, Malabar Hydraulics
(Commercially Available)
- (6) Pressure Gage, 100 to 1700 psig - Commercially Available

C. Consumable Materials

NOTE: Obey the instructions in AMM 12-15-11-301 for proper usage of fluids and for alternative fluids.

EFFECTIVITY

ALL

12-15-02

01

Page 309
Aug 22/04

- (1) D00467 Fluid - Hydraulic, BMS 3-32 (Recommended)

Type I - Royco SSF, Shell SSF and Castrolaero 35 (These fluids contain the mixture of MIL-H-6083 and Lubrizol 1395)

Type II - Royco LGF, Shell LGF and Castrolaero 40 (These fluids are the recommended fluid for servicing and contain the mixture of MIL-H-5606 and Lubrizol 1395)

NOTE: Type I is the recommended fluid to use when filling a strut after overhaul.

- (2) D00508 MIL-H-5606 Hydraulic Fluid

NOTE: This oil is the recommended fluid for servicing of the shock strut. For servicing, mix MIL-H-5606 in the correct proportion with Lubrizol 1395 before you fill the shock strut.

- (3) D00510 Lubrizol 1395
(4) D00509 MIL-H-6083 Hydraulic Fluid

NOTE: You can use this fluid with MIL-H-5606 and use it as an alternative for MIL-H-5606. For servicing, mix MIL-H-6083 in the correct proportion with Lubrizol 1395 before you fill the shock strut.

SAS
SAS
SAS
SAS
SAS

- (5) RMC 481-026-XX SHELL Landing Gear Fluid (SHELL LGF)

NOTE: RMC 481-026-XX is the preferred fluid and fully mixable with with the other fluids which is optional.

D. References

- (1) AMM 32-00-20/201, Landing Gear Downlocks
(2) AMM 12-15-11/301, Landing Gear Shock Strut Fluids

E. Access

- (1) Location Zone
711 Nose Landing Gear

F. Prepare to Do the Servicing of the Shock Strut

S 493-005

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 013-006

- (2) To open the forward doors of the nose landing gear, release the lock on rod 2 of the operating mechanism.

EFFECTIVITY

ALL

12-15-02

SAS

Page 310
Dec 22/07

S 843-021

- (3) Deflate the shock strut of the nose landing gear (Fig. 301).
(a) Remove the cap from the air valve at the top of the shock strut (Detail A).

WARNING: LOOSEN THE NUT FOR THE AIR VALVE A MAXIMUM OF TWO TURNS. AIR PRESSURE CAN BLOW THE VALVE OFF AND CAN CAUSE INJURY TO PERSONS.

- (b) Loosen the nut for the air valve.
(c) Let the shock strut deflate completely.

NOTE: The shock strut is fully deflated when you get the dimension A on Fig. 302.

G. Servicing of the Shock Strut

S 613-060

CAUTION: DO NOT ADD SMALL QUANTITIES OF HYDRAULIC FLUID WITHOUT LUBRIZOL MANY TIMES. THIS CAN DECREASE THE LUBRICITY OF THE FLUID IN THE STRUT WHICH CAN CAUSE DAMAGE TO THE STRUT.

- (1) You must add a lubricant to the shock strut during servicing. As an alternative, you can use a fluid which has an added lubricant. For usual servicing when small quantities of fluid are necessary, you can use fluid without lubricant to fill the shock strut.

S 033-008

- (2) Loosen the nut for the air valve to fully open the valve.

S 613-009

CAUTION: OBEY THE INSTRUCTIONS IN AMM 12-15-11/301 WHEN YOU ADD FLUID TO FILL THE SHOCK STRUT. IF AN INCORRECT FLUID IS USED, IT CAN CAUSE DAMAGE TO THE SEALS.

- (3) Fill the shock strut with a mixture of hydraulic fluid and Lubrizol (41:1 ratio).
(a) Make sure the shock strut is fully compressed

EFFECTIVITY

ALL

12-15-02

08

Page 311
Dec 22/07

WARNING: WHEN YOU COMPRESS THE SHOCK STRUT WITH AXLE JACKS, MAKE SURE YOU DO NOT LIFT THE AIRPLANE OFF OF THE AIRPLANE JACKS. IF THE AIRPLANE IS NOT ON THE AIRPLANE JACKS IT MAY FALL AND CAUSE DAMAGE TO EQUIPMENT AND INJURY TO PERSONS.

- 1) If the airplane is on jacks, use the axle jacks to fully compress the shock strut.

NOTE: The strut is fully compressed when the dimension A is 4.3 inches.

- (b) Remove the cap for the pressure seal from the oil charging valve.
- (c) Attach an oil charging line to the oil charging valve.
- (d) Make sure the air valve is fully open.
- (e) Attach one end of a hose to the air valve.
- (f) Put the other end of the hose in a drain bucket.

CAUTION: CLEAN ALL THE LEAKED HYDRAULIC FLUID FROM THE TIRES IMMEDIATELY. THE FLUID CAN CAUSE DAMAGE TO THE TIRES.

- (g) Fill the shock strut with hydraulic fluid until the hydraulic fluid flows into the drain bucket.
 - 1) Continue to fill the shock strut until the hydraulic fluid which flows into the bucket is free of bubbles.
- (h) Remove the oil charging line.
- (i) Put the cap on the oil charging valve for the pressure seal.
- (j) Remove the hose from the air valve.

S 863-010

- (4) Inflate the shock strut for the nose landing gear (Airplane on Ground).
 - (a) Install the inflation tool on the air valve. Use the instructions supplied with the tool.
 - (b) Use dry air or nitrogen to inflate the shock strut until the dimension A is approximately 8 inches or 800 psig (Fig. 302).
 - (c) Use a pressure gage to measure the pressure of the shock strut.
 - (d) Add or release the dry air or nitrogen, until the measured pressure is in the range shown on the servicing chart.

NOTE: Dimension "A" and the pressure must be on the servicing curve for a correctly serviced shock strut.

S 863-061

- (5) Inflate the shock strut for the nose landing gear (Airplane on Jacks).
 - (a) Lift the airplane to extend the shock strut fully (AMM 07-11-01/201).

EFFECTIVITY

ALL

12-15-02

06

Page 312
Dec 22/07

- (b) Install the inflation tool on the air valve. Use the instructions supplied with the tool.
- (c) Add or release dry air or Nitrogen to service the fully extended shock strut at 200 psig.

NOTE: Do not add hydraulic fluid when the airplane weight is not on the landing gear. When you service the landing gear with dry air or Nitrogen, it is not necessary to service the landing gear again when it is lowered and the jacks are removed. A fully serviced shock strut is also necessary before you do the extension and retraction test.

S 093-011

- (6) Remove the inflation tool from the air valve.

S 433-012

- (7) Tighten the swivel nut to 5-7 pound-feet (Detail A, Fig. 301).

S 433-013

- (8) Put the cap on the air valve.

S 973-056

CAUTION: SHOCK STRUT FLUID CAN ABSORB NITROGEN OR AIR AFTER A COMPLETE SERVICING. THIS WILL REDUCE THE PRESSURE IN THE SHOCK STRUT, WHICH CAN CAUSE DAMAGE TO EQUIPMENT.

- (9) If the shock strut was overhauled, the fluid was completely replaced or the shock strut was completely deflated, then after 5-10 in service landings you must do the task "Service the Shock Strut with Nitrogen Only"

H. Put the Airplane Back to Its Usual Condition

S 413-014

- (1) Manually close the forward doors of the nose landing gear.

TASK 12-15-02-603-042

4. Servicing of the Shock Strut with Nitrogen Only

A. Equipment

- (1) Strut Inflation Tool - F70200-14
- (2) Pressure Gage, 800 to 2500 PSIG - Commercially Available.

B. Consumable Materials

- (1) Dry Nitrogen (Recommended), 3000 psi
(Commercially Available)

C. Access

- (1) Location Zones
731/741 Main Landing Gear

EFFECTIVITY

ALL

12-15-02

05

Page 313
Apr 22/08

D. Prepare to Do the Servicing of the Shock Strut

S 423-057

WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 423-044

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

E. Service the Shock Strut with Nitrogen Only

S 023-045

- (1) Remove the cap from the air valve.

S 483-046

- (2) Install the inflation tool on the air valve.

NOTE: Use the instructions supplied with the tool.

S 023-058

WARNING: LOOSEN THE NUT FOR THE AIR VALVE A MAXIMUM OF TWO TURNS. DO NOT REMOVE THE VALVE BODY ON A PRESSURIZED STRUT. AIR PRESSURE CAN BLOW THE VALVE OUT AND INJURE PERSONNEL.

- (3) Loosen the swivel nut for the air valve two turns.

S 223-048

- (4) Measure the actual "A" dimension on the strut (Fig. 302).

S 223-049

- (5) Use the chart on Fig. 302 to find the "A" dimension that corresponds to the pressure you measured.

S 223-050

- (6) Compare the "A" dimension from the chart to the "A" dimension that you actually measured.

S 423-051

- (7) If the actual measured "A" dimension is not within the upper and lower limits of the "A" dimension from the chart, then do the step that follows:
 - (a) Add or release the nitrogen until you get the "A" dimension for the pressure measured.

EFFECTIVITY

ALL

12-15-02

04

Page 314
Apr 22/08

S 423-052

- (8) Tighten the swivel nut to 5 - 7 pound-feet to close the air valve.

S 083-053

- (9) Remove the inflation tool from the air valve.

S 423-054

- (10) Install the cap on the air valve.

F. Put the Airplane Back to Its Usual Condition

S 983-055

- (1) Manually close the forward doors of the nose landing gear.

EFFECTIVITY

ALL

12-15-02

02

Page 315
Dec 22/07

LANDING GEAR TIRES – SERVICING

1. General

- A. This procedure contains three tasks.
The first task is a hot tire pressure check.
The second task is tire servicing. This task includes a check of the tire pressure at all wheel locations and servicing of the tires to the correct pressure, if it is necessary.
The third task applies only to airplanes with the Tire Pressure Indicating System (TPIS). This task is a functional check of the accuracy of the tire pressure indicating system using a hand held tire pressure gage calibrated to a specific level of accuracy. This check is a necessary periodic maintenance requirement to allow the Tire Pressure Indicating System (TPIS) to be used for the daily tire pressure check.

CAUTION: USE A CALIBRATED GAGE WITH AN APPROVED DIAL TO DO A CHECK OF THE TIRE PRESSURE. IF THE GAGE IS NOT ACCURATE, YOU CAN INFLATE THE TIRE TO THE INCORRECT PRESSURE. THIS CAN CAUSE DAMAGE TO THE TIRE.

- (1) AIRPLANES WITH INTEGRAL TIRE PRESSURE GAGE/FILL VALVE ASSEMBLIES ON THE NOSE AND MAIN GEAR WHEELS;
(a) The tire pressure gage is part of an assembly that includes the gage and the tire fill valve. You can use the gage for walk-around inspections and other fast checks. You must use a calibrated gage with an approved dial when you inflate a tire. You must also use the calibrated gage when the tire pressure indication must be very accurate.

WARNING: USE A REGULATED PRESSURE SOURCE TO SERVICE THE TIRES. AN UNREGULATED PRESSURE SOURCE CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

WARNING: THE SERVICING CART AND ALL PERSONNEL SHALL BE POSITIONED FORE OR AFT (TREAD SIDE) OF THE TIRE WHEN SERVICING TO PREVENT INJURIES, DEATH AND EQUIPMENT DAMAGE.

- (2) When you install a replacement wheel and tire assembly, you must initially inflate the tire with nitrogen.
(3) You can add air to a tire that is in service when nitrogen is not available, but you must obey this limit:
(a) The oxygen in the air that you add must not be more than 5 percent of the total tire volume.
(4) Two procedures to add air to a tire are found in the "Add Nitrogen or Air to a Tire" procedure.
(5) The first procedure (Procedure 1) permits one value of 13 psi for the sum of all air refill pressures. This procedure is easier to use than the second procedure. Use this procedure if the air refill pressure that is necessary is less than 13 psi.

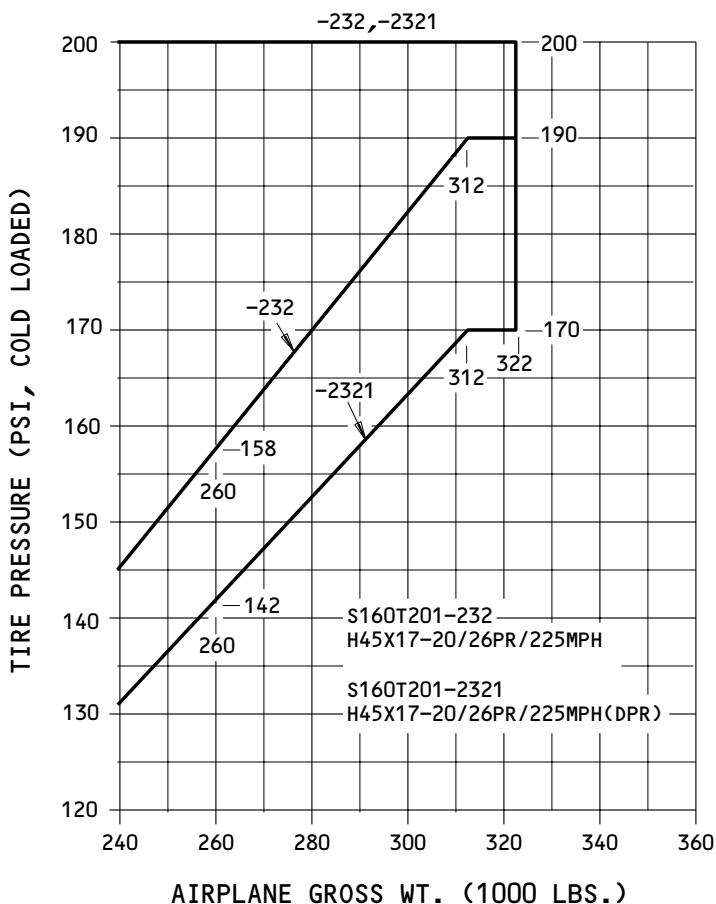
EFFECTIVITY

ALL

12-15-03

04

Page 301
Dec 22/06



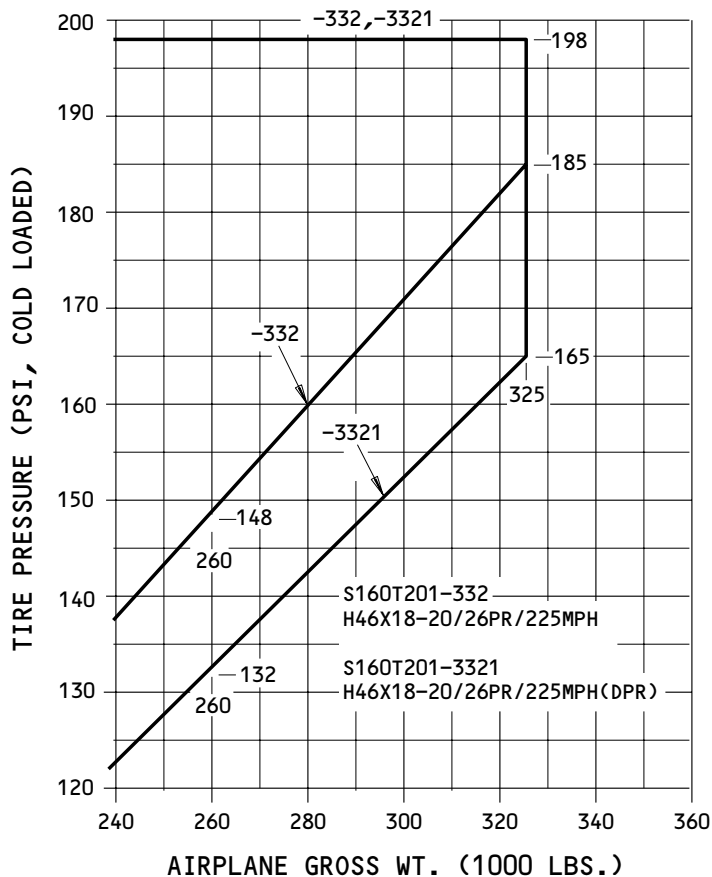
MAIN GEAR

- NOTES:**
1. FIND A TIRE PRESSURE IN THE APPLICABLE RANGE FOR THE TIRE AND AIRPLANE WEIGHT.
 2. YOU MUST INFLATE THE TIRES ON THE SAME AXLE TO THE SAME PRESSURE.
 3. THE TOLERANCE FOR THE INFLATION PRESSURE IS +5/-0 PSI.
 4. THE INFLATION PRESSURES THAT ARE SHOWN ARE FOR COLD, LOADED (THE WEIGHT OF THE AIRPLANE IS ON THE TIRES) TIRES. REDUCE THE PRESSURE 4% FOR TIRES THAT ARE NOT LOADED.
 5. THE OPERATIONAL WEIGHT OF THE AIRPLANE MUST BE LESS THAN OR EQUAL TO THE AIRPLANE'S MAXIMUM DESIGN TAXI WEIGHT (REFER TO THE AIRPLANE WEIGHT - CENTER OF GRAVITY LIMITS IN THE WEIGHTS AND BALANCE MANUAL FOR THE MAXIMUM DESIGN TAXI WEIGHT).
 6. (DPR) = DUAL PRESSURE RATED TIRE PER S160T201

Tire Pressure Limits
Figure 301 (Sheet 1)

EFFECTIVITY
767-200 AIRPLANES

12-15-03



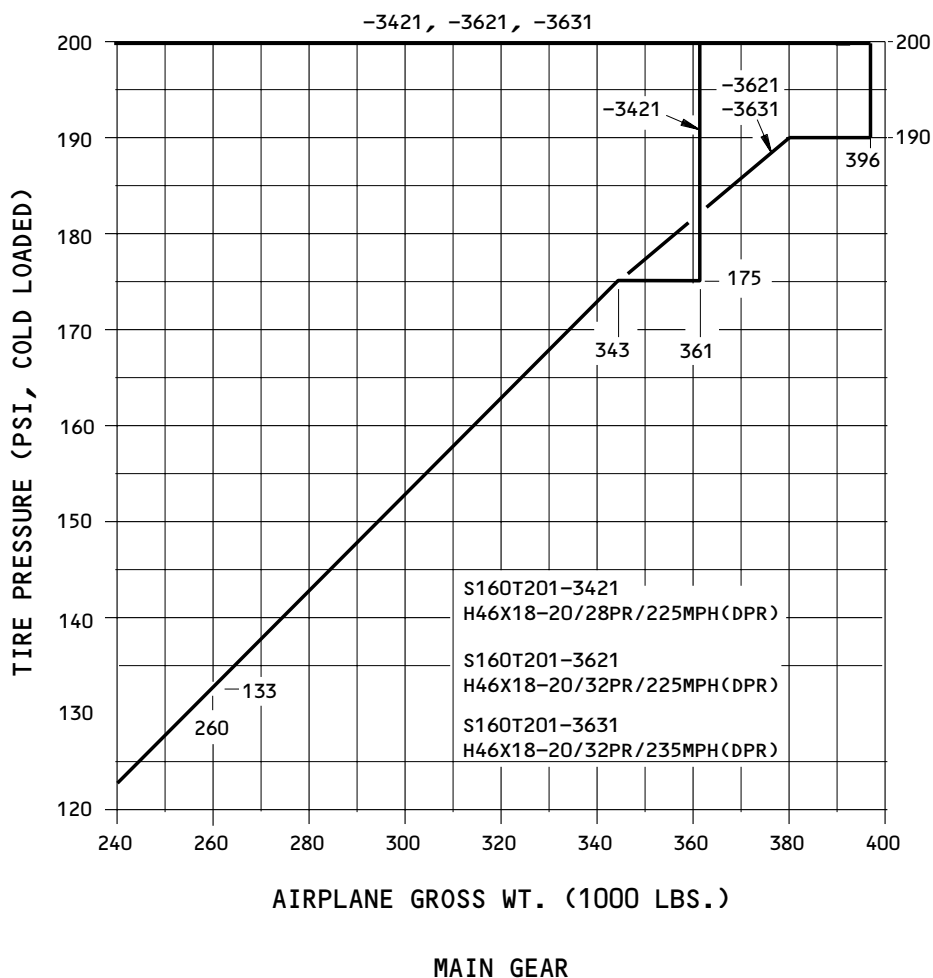
MAIN GEAR

Tire Pressure Limits
Figure 301 (Sheet 2)

EFFECTIVITY
767-200 AIRPLANES

12-15-03

BOEING
767
MAINTENANCE MANUAL



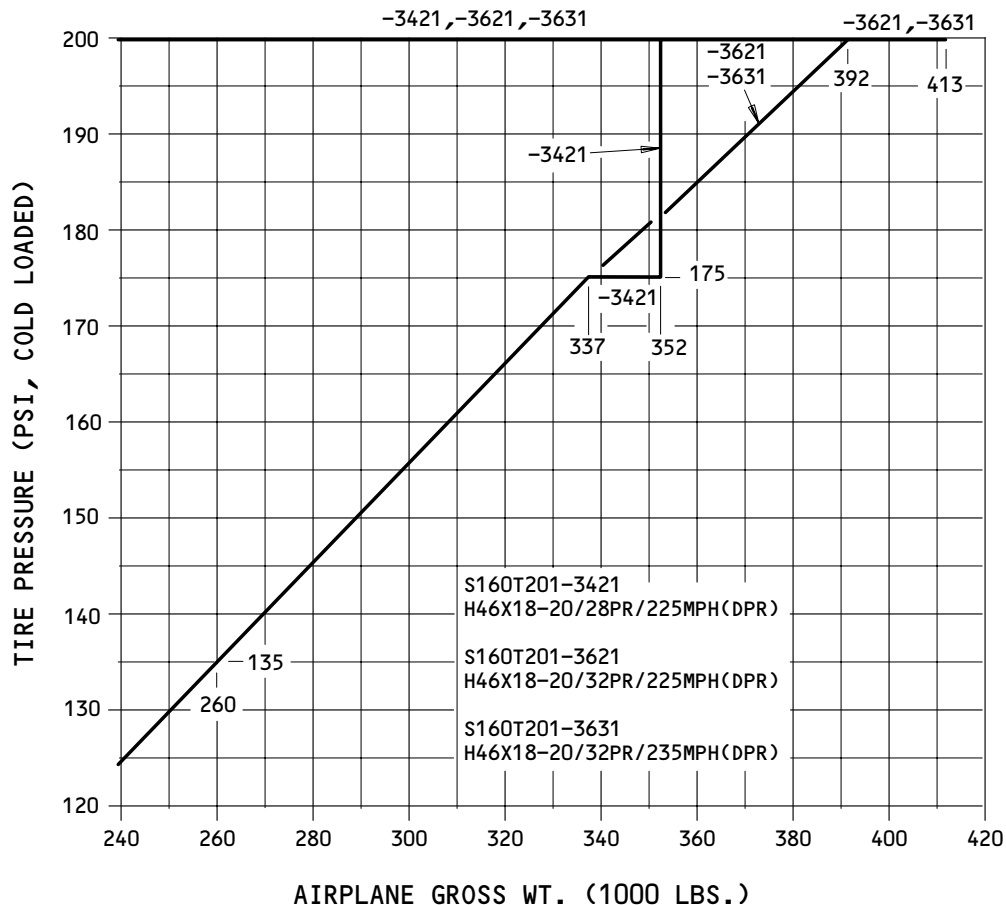
- NOTES:**
1. FIND A TIRE PRESURE IN THE APPLICABLE RANGE FOR THE TIRE AND AIRPLANE WEIGHT.
 2. YOU MUST INFLATE THE TIRES ON THE SAME AXLE TO THE SAME PRESSURE.
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 4. THE INFLATION PRESSURES THAT ARE SHOWN ARE FOR COLD, LOADED (THE WEIGHT OF THE AIRPLANE IS ON THE TIRES) TIRES. REDUCE THE PRESSURE 4% FOR TIRES THAT ARE NOT LOADED.
 5. THE OPERATIONAL WEIGHT OF THE AIRPLANE MUST BE LESS THAN OR EQUAL TO THE AIRPLANE'S MAXIMUM DESIGN TAXI WEIGHT (REFER TO THE AIRPLANE WEIGHT - CENTER OF GRAVITY LIMITS IN THE WEIGHTS AND BALANCE MANUAL FOR THE MAXIMUM DESIGN TAXI WEIGHT).
 6. (DPR) = DUAL PRESSURE RATED TIRE PER S160T201.

Tire Pressure Limits
Figure 301 (Sheet 3)

EFFECTIVITY
767-200 AIRPLANES

12-15-03

BOEING
767
MAINTENANCE MANUAL



MAIN GEAR

- NOTES:**
1. FIND A TIRE PRESURE IN THE APPLICABLE RANGE FOR THE TIRE AND AIRPLANE WEIGHT.
 2. YOU MUST INFLATE THE TIRES ON THE SAME AXLE TO THE SAME PRESSURE.
 3. THE TOLERANCE FOR THE INFLATION PRESSURE IS +5/-0 PSI.
 4. THE INFLATION PRESSURES THAT ARE SHOWN ARE FOR COLD, LOADED (THE WEIGHT OF THE AIRPLANE IS ON THE TIRES) TIRES. REDUCE THE PRESSURE 4% FOR TIRES THAT ARE NOT LOADED.
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 6. (DPR) = DUAL PRESSURE RATED TIRE PER S160T201.

Tire Pressure Limits
Figure 301A (Sheet 2)

EFFECTIVITY
767-300ER

12-15-03

06

Page 306
Nov 10/95

BOEING
767
MAINTENANCE MANUAL

AIRCRAFT TYPE	GROSS WEIGHT (LBS X 1000)
767-200	240 282 322
767-200ER	240 295 352.2 361
767-200ER (IGW)	240 295 354 360 388
767-300	240 315.5 352
767-300ER	240 315.5 381 388
767-300ER (IGW)	240 320 401 409

NOTE: USE THIS CHART TO FIND THE CORRECT NOSE GEAR TIRE SERVICING CHART IN FIG. 303. DETERMINE THE MAXIMUM GROSS WEIGHT CONFIGURATION OF THE AIRPLANE TO BE SERVICED AND USE THE TIRE SERVICING CHART FOR THE CORRESPONDING AIRPLANE TYPE. (FOR EXAMPLE, IF YOU ARE SERVICING THE NOSE GEAR TIRE ON A 401,000 POUND MAXIMUM TAXI WEIGHT AIRPLANE, USE THE 767-300ER NOSE GEAR TIRE SERVICING CHART.)

1 THE GROSS WEIGHTS SHOWN ARE THE MAXIMUM TAXI WEIGHTS FOR THE VARIOUS CONFIGURATIONS OF 767-200 AND 767-300 TYPE AIRPLANES IN SERVICE.

767-200 and 767-300 Airplane Type and Gross Weight Configurations
Figure 302

EFFECTIVITY

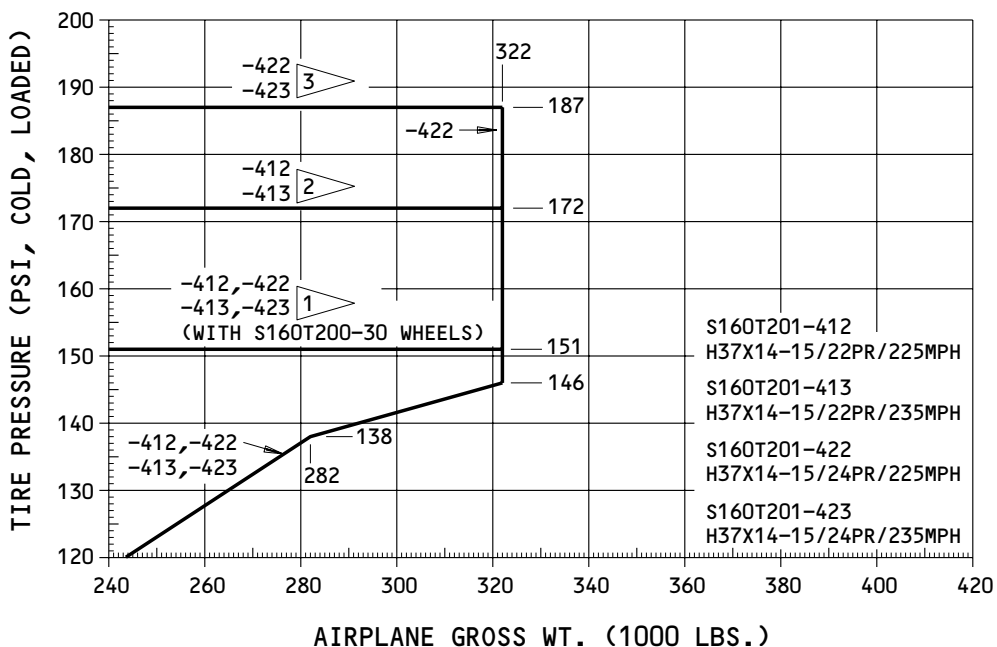
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12-15-03

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Page 307
Feb 10/92

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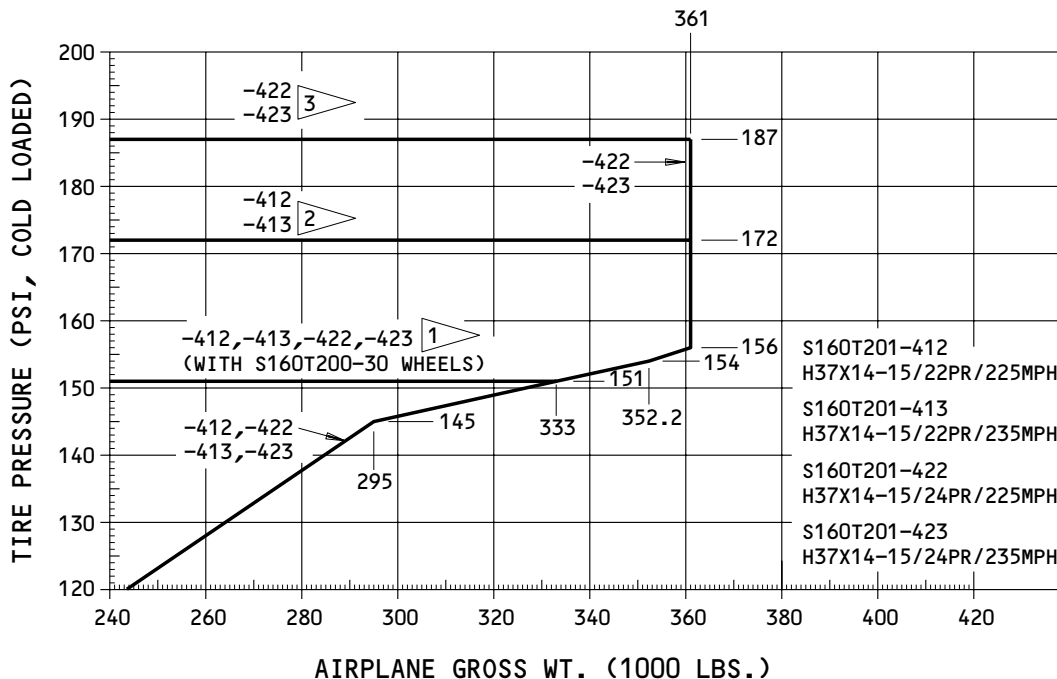
- NOTES:**
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 5. THE OPERATIONAL WEIGHT OF THE AIRPLANE MUST BE LESS THAN OR EQUAL TO THE AIRPLANE'S MAXIMUM DESIGN TAXI WEIGHT (REFER TO THE AIRPLANE WEIGHT - CENTER OF GRAVITY LIMITS IN THE WEIGHTS AND BALANCE MANUAL FOR THE MAXIMUM DESIGN TAXI WEIGHT).
 6. (DPR) = DUAL PRESSURE RATED TIRE PER S160T201

1. LIMIT TIRE INFLATION PRESSURE TO 151 PSI MAXIMUM WHEN THE AIRPLANE IS OPERATED WITH THE S160T200-30 WHEEL
2. LIMIT TIRE INFLATION PRESSURE TO 172 PSI MAXIMUM WHEN THE AIRPLANE IS OPERATED WITH THE S160T201-412 OR -413 TIRE
3. LIMIT TIRE INFLATION PRESSURE TO 187 PSI MAXIMUM WHEN THE AIRPLANE IS OPERATED WITH THE S160T201-422 OR -423 TIRE

Nose Gear Tire Pressure Limits
Figure 303 (Sheet 1)

EFFECTIVITY
767-200

12-15-03



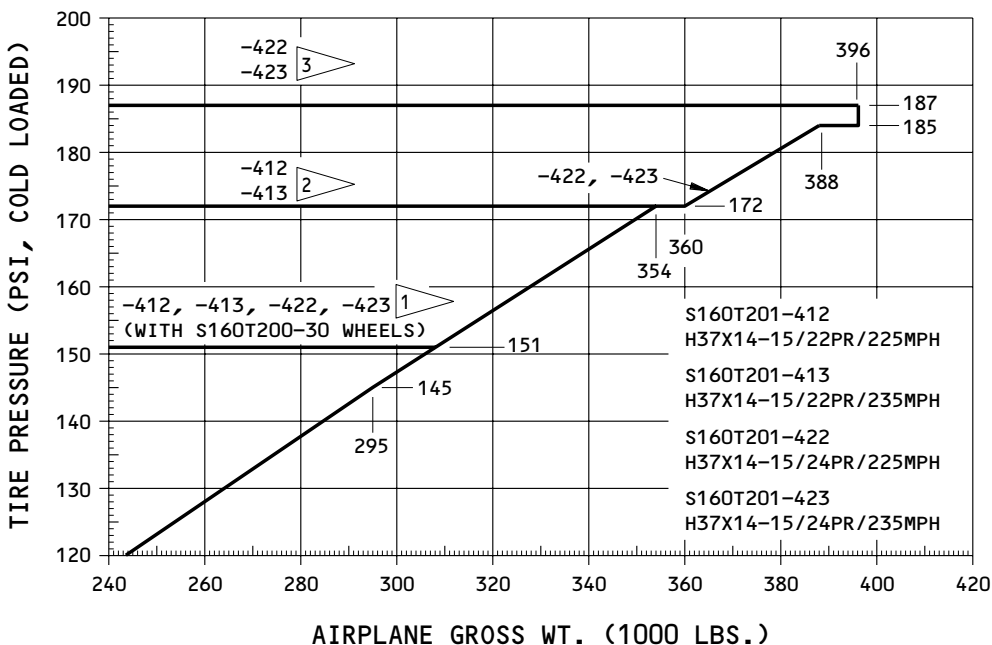
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 3. THE TOLERANCE FOR THE INFLATION PRESSURE IS +5/-0 PSI.
 4. THE INFLATION PRESSURES THAT ARE SHOWN ARE FOR COLD, LOADED (THE WEIGHT OF THE AIRPLANE IS ON THE TIRES) TIRES. REDUCE THE PRESSURE 4% FOR TIRES THAT ARE NOT LOADED.
 5. THE OPERATIONAL WEIGHT OF THE AIRPLANE MUST BE LESS THAN OR EQUAL TO THE AIRPLANE'S MAXIMUM DESIGN TAXI WEIGHT (REFER TO THE AIRPLANE WEIGHT - CENTER OF GRAVITY LIMITS IN THE WEIGHTS AND BALANCE MANUAL FOR THE MAXIMUM DESIGN TAXI WEIGHT).
 6. (DPR) = DUAL PRESSURE RATED TIRE PER S160T201

- 1 LIMIT TIRE INFLATION PRESSURE TO 151 PSI MAXIMUM WHEN THE AIRPLANE IS OPERATED WITH THE S160T200-30 WHEEL
- 2 LIMIT TIRE INFLATION PRESSURE TO 172 PSI MAXIMUM WHEN THE AIRPLANE IS OPERATED WITH THE S160T201-412 OR -413 TIRE
- 3 LIMIT TIRE INFLATION PRESSURE TO 187 PSI MAXIMUM WHEN THE AIRPLANE IS OPERATED WITH THE S160T201-422 OR -423 TIRE

Nose Gear Tire Pressure Limits
Figure 303 (Sheet 2)

EFFECTIVITY
767-200ER

12-15-03



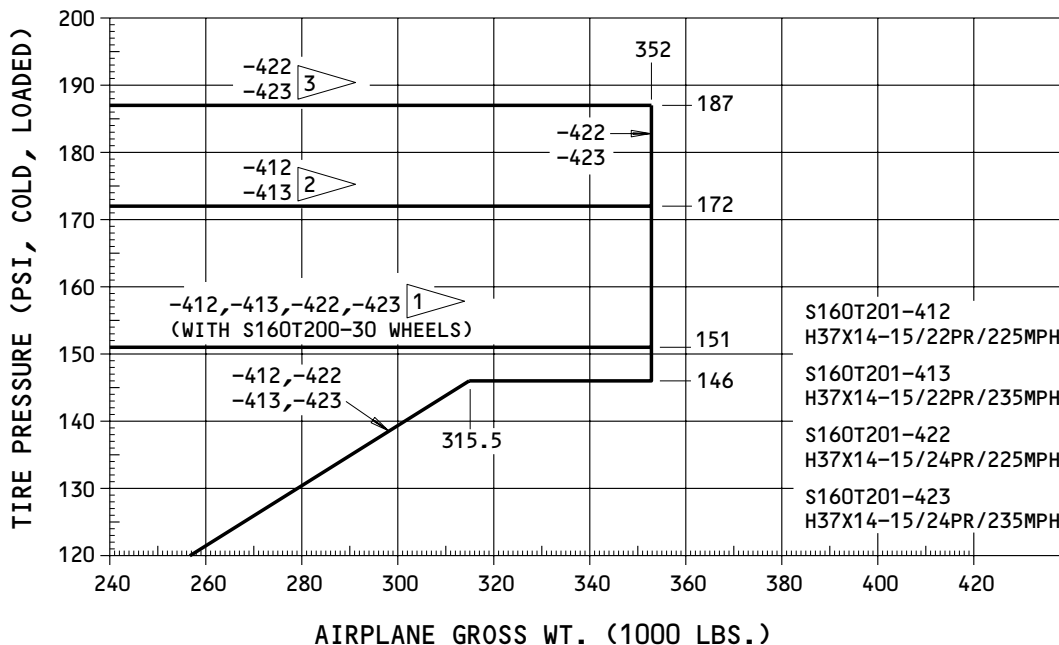
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2. LIMIT TIRE INFLATION PRESSURE TO 172 PSI MAXIMUM WHEN THE AIRPLANE IS OPERATED WITH THE S160T201-412 OR -413 TIRE
3. LIMIT TIRE INFLATION PRESSURE TO 187 PSI MAXIMUM WHEN THE AIRPLANE IS OPERATED WITH THE S160T201-422 OR -423 TIRE

Nose Gear Tire Pressure Limits
Figure 303 (Sheet 3)

EFFECTIVITY
767-200ER(IGW)

12-15-03



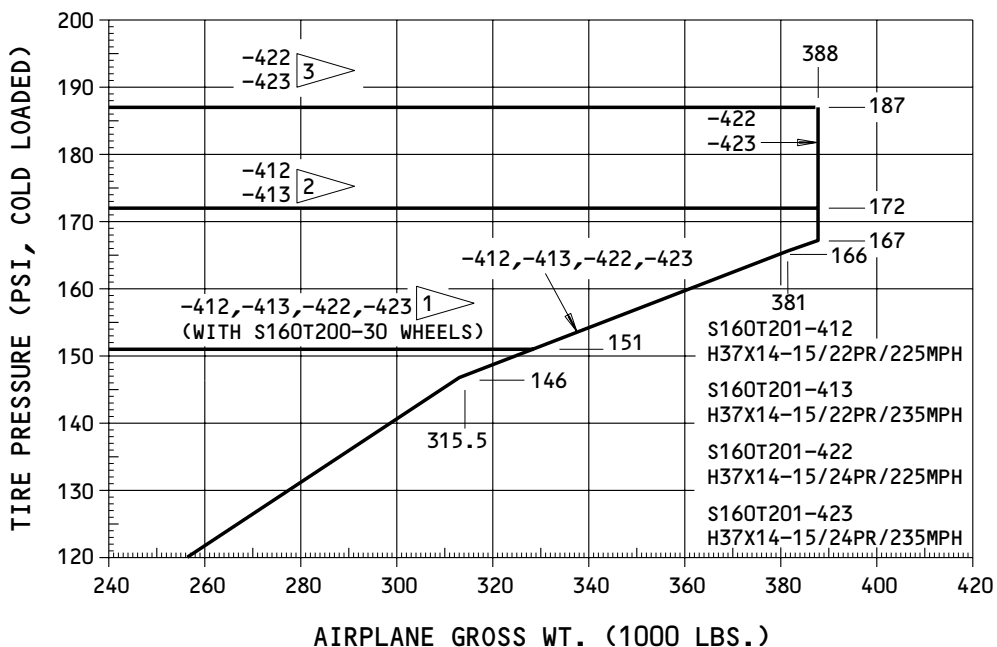
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 5. THE OPERATIONAL WEIGHT OF THE AIRPLANE MUST BE LESS THAN OR EQUAL TO THE AIRPLANE'S MAXIMUM DESIGN TAXI WEIGHT (REFER TO THE AIRPLANE WEIGHT - CENTER OF GRAVITY LIMITS IN THE WEIGHTS AND BALANCE MANUAL FOR THE MAXIMUM DESIGN TAXI WEIGHT).
 6. (DPR) = DUAL PRESSURE RATED TIRE PER S160T201

- 1 LIMIT TIRE INFLATION PRESSURE TO 151 PSI MAXIMUM WHEN THE AIRPLANE IS OPERATED WITH THE S160T200-30 WHEEL
- 2 LIMIT TIRE INFLATION PRESSURE TO 172 PSI MAXIMUM WHEN THE AIRPLANE IS OPERATED WITH THE S160T201-412 OR -413 TIRE
- 3 LIMIT TIRE INFLATION PRESSURE TO 187 PSI MAXIMUM WHEN THE AIRPLANE IS OPERATED WITH THE S160T201-422 OR -423 TIRE

Nose Gear Tire Pressure Limits
Figure 303A (Sheet 1)

EFFECTIVITY
767-300

12-15-03



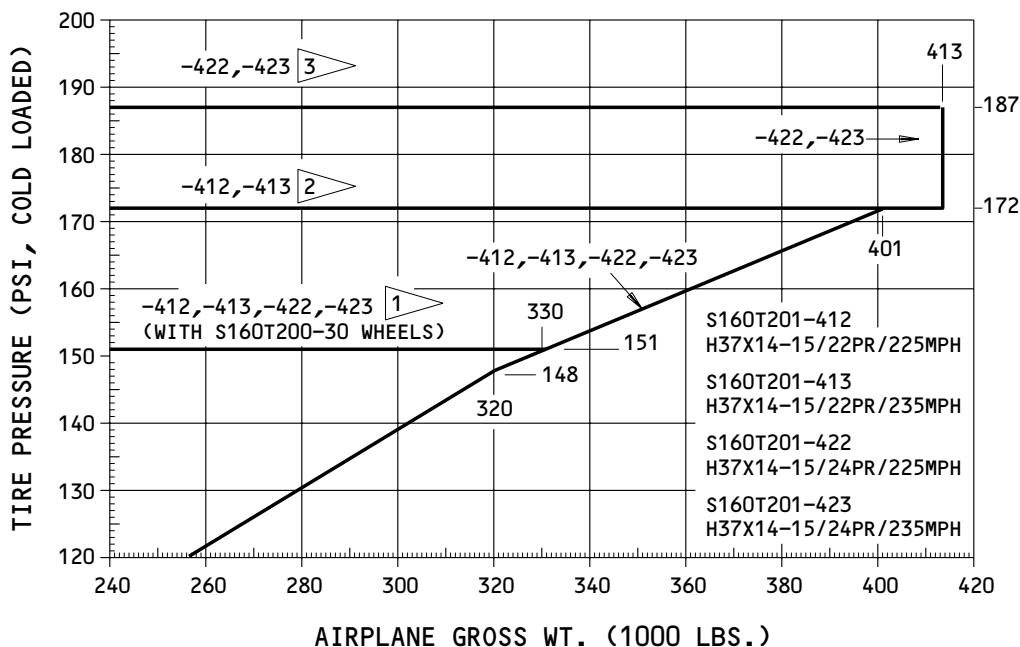
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2. LIMIT TIRE INFLATION PRESSURE TO 172 PSI MAXIMUM WHEN THE AIRPLANE IS OPERATED WITH THE S160T201-412 OR -413 TIRE
3. LIMIT TIRE INFLATION PRESSURE TO 187 PSI MAXIMUM WHEN THE AIRPLANE IS OPERATED WITH THE S160T201-422 OR -423 TIRE

Nose Gear Tire Pressure Limits
Figure 303A (Sheet 2)

EFFECTIVITY
767-300ER

12-15-03



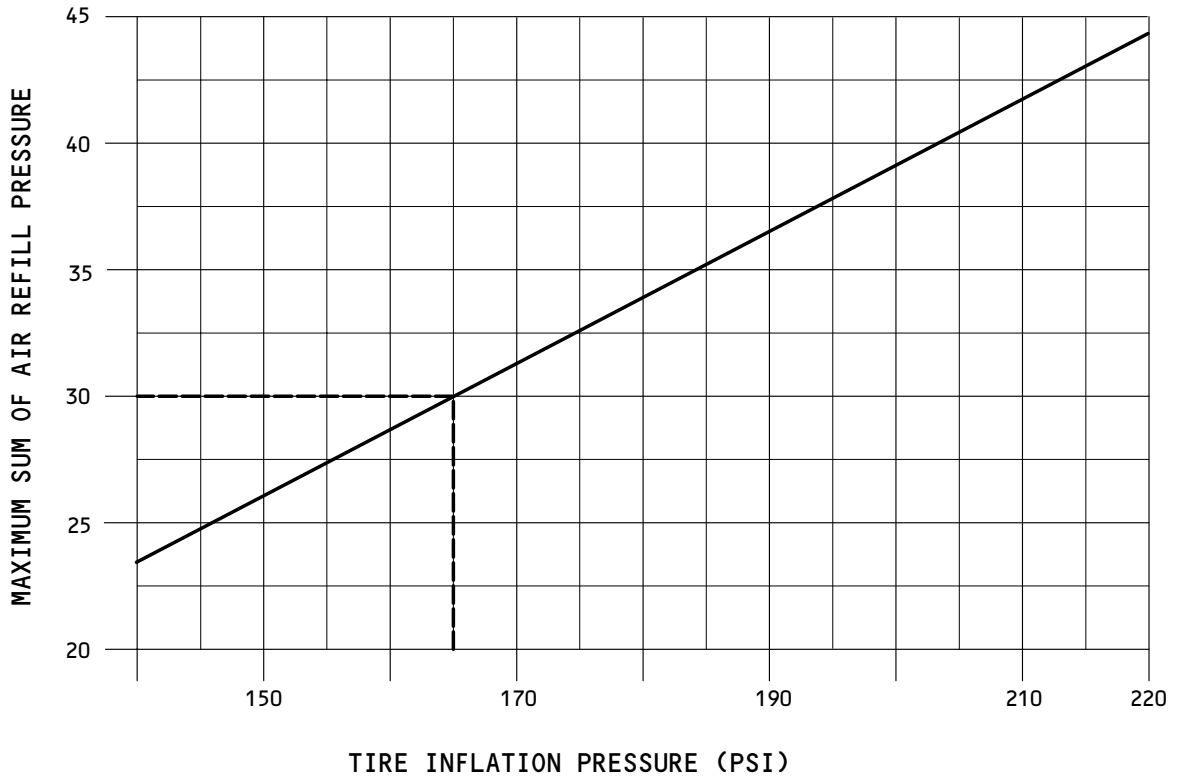
- NOTES:**
1. FIND A TIRE PRESSURE IN THE APPLICABLE RANGE FOR THE TIRE AND AIRPLANE WEIGHT.
 2. YOU MUST INFLATE THE TIRES ON THE SAME AXLE TO THE SAME PRESSURE.
 3. THE TOLERANCE FOR THE INFLATION PRESSURE IS +5/-0 PSI.
 4. THE INFLATION PRESSURES THAT ARE SHOWN ARE FOR COLD, LOADED (THE WEIGHT OF THE AIRPLANE IS ON THE TIRES) TIRES. REDUCE THE PRESSURE 4% FOR TIRES THAT ARE NOT LOADED.
 5. THE OPERATIONAL WEIGHT OF THE AIRPLANE MUST BE LESS THAN OR EQUAL TO THE AIRPLANE'S MAXIMUM DESIGN TAXI WEIGHT (REFER TO THE AIRPLANE WEIGHT - CENTER OF GRAVITY LIMITS IN THE WEIGHTS AND BALANCE MANUAL FOR THE MAXIMUM DESIGN TAXI WEIGHT).
 6. (DPR) = DUAL PRESSURE RATED TIRE PER S160T201

- 1 LIMIT TIRE INFLATION PRESSURE TO 151 PSI MAXIMUM WHEN THE AIRPLANE IS OPERATED WITH THE S160T200-30 WHEEL
- 2 LIMIT TIRE INFLATION PRESSURE TO 172 PSI MAXIMUM WHEN THE AIRPLANE IS OPERATED WITH THE S160T201-412 OR -413 TIRE
- 3 LIMIT TIRE INFLATION PRESSURE TO 187 PSI MAXIMUM WHEN THE AIRPLANE IS OPERATED WITH THE S160T201-422 OR -423 TIRE

Nose Gear Tire Pressure Limits
Figure 303A (Sheet 3)

EFFECTIVITY
767-300ER(IGW), 767-300F

12-15-03



Air Refill Pressure
Figure 304

EFFECTIVITY

ALL

12-15-03

01

Page 314
Feb 10/92

998476

- (6) The second procedure (Procedure 2) permits different refill pressure values across the range of permitted tire pressures. Use this procedure if the air refill pressure that is necessary is more than 13 psi.
- B. The "Tire Pressure Check" procedure will tell you if you can service a tire or if you need to replace the tire. This procedure applies for all usual airline service and operation at maximum taxi gross weight.
- C. Use an accurate gage to measure the tire pressures each day. The tires must be cool when you do a pressure check. Do not do a tire pressure check until 2 hours after a flight. Do not release gas from a hot tire to decrease the pressure to agree with the tire pressure limits.
- D. Use an accurate gage or the Tire Pressure Indicating System (TPIS), if installed, to measure the tire pressures each day. The tires must be cool when you do a pressure check. Do not do a tire pressure check until 2 hours after a flight. Do not release gas from a hot tire to decrease the pressure to agree with the tire pressure limits.

TASK 12-15-03-613-051

2. Main Landing Gear and Nose Landing Gear Hot Tire Pressure Check

NOTE: The hot tire pressure check procedure is intended for occasional use only. It is not intended to be used as a permanent alternative method to performing the more accurate cold tire checks. The more accurate cold tire pressure check method should be used as frequently as possible to avoid possible tire service life problems such as tread losses and carcass ruptures.

- A. General
 - (1) If the wheel, brake, or tire equipment is suspected of being overheated, do this task: High Energy Stop (AMM 05-51-14/201).
 - (2) The intent of this task is to provide a method to check tire overheated, pressures prior to a two hour cool down of the tires, or for pressure checks subsequent to the required daily pressure check.
 - (3) It is recommended that you check the tire pressure after you let the tires cool for a minimum of two hours since the airplane landed.
 - (4) If it is not possible to wait the recommended two hours for the tires to cool down before the airplane is dispatched, you can use this task as an alternative inspection just prior to dispatch.
 - (5) It is acceptable to use the Tire Pressure Indication System (TPIS) or the pressure gage to measure the tire pressures.
- B. Equipment
 - (1) Tire Inflation Adapter - A12007-11
- C. Consumable Materials
 - (1) G01158 Nitrogen, Gaseous (Dry, Commercial Grade, 99.5 percent pure), from a pressure regulated source

EFFECTIVITY

ALL

12-15-03

D. References

- (1) AMM 32-45-01/401, Main Gear Tires
- (2) AMM 32-45-02/401, Nose Gear Tires

E. Access

- (1) Location Zones
 - 711 Nose Landing Gear
 - 731 Left Main Landing Gear
 - 741 Right Main Landing Gear

F. Procedure

S 613-063

- (1) Make sure that all antiskid and autobrake system equipment is serviceable.

NOTE: If there are problems with the antiskid or autobrake systems, the average tire pressures can be higher than normal. This could cause you to over-inflate a suspected low pressure tire.

S 613-064

WARNING: DO NOT GO NEAR WHEEL, BRAKE, OR TIRE EQUIPMENT WHICH ARE SUSPECTED OF BEING OVERHEATED. DO THE PROCEDURE FOR HIGH ENERGY STOP/HEAT DAMAGE. INJURY TO PERSONS CAN OCCUR.

CAUTION: MAKE SURE THE DIRECT READING GAGE IS CORRECTLY CALIBRATED AND HAS AN APPROVED DIAL. IF THE GAGE IS NOT ACCURATE, YOU CAN INFLATE THE TIRES TO AN INCORRECT PRESSURE. THIS CAN CAUSE DAMAGE TO THE TIRES.

- (2) If all of the tires can be assumed to be at approximately the same temperature, measure all of the main landing gear tire pressures and make a record of the values.
 - (a) You can use either the Tire Pressure Indication System (TPIS) or the pressure gage to measure the tire pressures.

EFFECTIVITY

ALL

12-15-03

03

Page 316
Dec 22/02

S 613-052

CAUTION: DO NOT DEFLATE A HOT TIRE TO LOWER THE PRESSURE TO THE AVERAGE PRESSURE VALUE. PRESSURE SHOULD NEVER BE BLED FROM A HOT TIRE TO ACHIEVE A SPECIFIED VALUE. DAMAGE TO EQUIPMENT CAN OCCUR.

- (3) Use the tire pressure tables for the main landing gear and nose landing gear (use the tire pressures that are listed in the task for performing a tire pressure check):

NOTE: The inflation pressures that are shown are for cold, loaded tires (for example, with the airplane resting on the tires). For unloaded tires, decrease the pressure by 5 psig.

S 613-053

- (4) For the applicable airplane maximum taxi weight and tire, find the minimum service pressure.

S 613-054

- (5) Make sure the all of the tire pressures are above the minimum "cold" specified pressures for the airplane's maximum taxi weight.

S 613-055

CAUTION: DO NOT DEFLATE A HOT TIRE TO LOWER THE PRESSURE TO THE AVERAGE PRESSURE VALUE. PRESSURE SHOULD NEVER BE BLED FROM A HOT TIRE TO ACHIEVE A SPECIFIED VALUE. DAMAGE TO EQUIPMENT CAN OCCUR.

- (6) If the pressure of one tire is low, calculate the average of the other seven tires.

S 613-060

WARNING: USE A REGULATED PRESSURE SOURCE TO SERVICE THE TIRES. AN UNREGULATED PRESSURE SOURCE CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (7) If the pressure of the low tire is 5% - 10% less than the average pressure of the other seven tires, do these steps:
- (a) Connect the inflator, A12007-11 to the inflation valve and inflate the tire with Nitrogen, A-A-59503, Type I, Grade B, to the average value of the other seven tires.
 - (b) Remove the inflator, A12007-11 from the inflation valve.

EFFECTIVITY

ALL

12-15-03

04

Page 317
Aug 22/05

S 613-057

- (8) If the pressure of the low tire is more than 10% below the average of the other seven tires, do these steps:
- (a) Replace the tire and wheel assembly.
 - 1) Send the wheel and tire assembly for an inspection to find the cause for the low tire pressure.

S 613-059

- (9) If the pressure of one tire is more than 20% below the average pressure of the other seven tires, do these steps:
- (a) Replace the wheel and tire assembly.
 - 1) Send the wheel and tire assembly for an inspection to find the cause for the low tire pressure.
 - (b) Replace the wheel and tire assembly installed on the opposite side of that axle.
 - 1) Mark on the tire that it was on the same axle with a wheel and tire assembly that was replaced because of low tire pressure.
 - 2) Send the tire for inspection for damage.

S 613-073

WARNING: DO NOT GO NEAR WHEEL, BRAKE, OR TIRE EQUIPMENT WHICH ARE SUSPECTED OF BEING OVERHEATED. DO THE PROCEDURE FOR HIGH ENERGY STOP/HEAT DAMAGE. INJURY TO PERSONS CAN OCCUR.

CAUTION: MAKE SURE THE DIRECT READING GAGE IS CORRECTLY CALIBRATED AND HAS AN APPROVED DIAL. IF THE GAGE IS NOT ACCURATE, YOU CAN INFLATE THE TIRES TO AN INCORRECT PRESSURE. THIS CAN CAUSE DAMAGE TO THE TIRES.

- (10) Use the pressure gage to measure the nose landing gear tire pressures.

S 613-067

- (11) For the applicable airplane maximum taxi weight and tire, find the minimum nose tire service pressure (Fig. 302).

EFFECTIVITY

ALL

12-15-03

03

Page 318
Apr 22/08

S 613-068

- (12) Make sure both of the nose gear tires are above the minimum cold specified pressures for the airplane's maximum weight.

S 613-072

CAUTION: DO NOT DEFLATE A HOT TIRE TO LOWER THE PRESSURE TO THE PRESSURE OF THE OTHER TIRE. PRESSURE SHOULD NEVER BE BLED FROM A HOT TIRE TO ACHIEVE A SPECIFIED VALUE. DAMAGE TO EQUIPMENT CAN OCCUR.

- (13) If the pressure of one tire is 5%-10% below the pressure of the other tire, do these steps:

WARNING: USE A REGULATED PRESSURE SOURCE TO SERVICE THE TIRES. AN UNREGULATED PRESSURE SOURCE CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (a) Connect the inflator, A12007-11 to the inflation valve and inflate the tire with Nitrogen, A-A-59503, Type I, Grade B, to the value of the other tire.
- (b) Remove the inflator, A12007-11 from the inflation valve.

S 613-070

- (14) If the pressure of the low tire is more than 10% below the pressure of the other tire, do these steps:

- (a) Replace the tire and wheel assembly (AMM 32-45-02/401).
 - 1) Send the tire and wheel assembly for an inspection to find the cause for the low tire pressure.

S 613-071

- (15) If the pressure of the low tire is more than 20% below the pressure of the other tire, do these steps:

- (a) Replace the wheel and tire assembly.
 - 1) Send the wheel and tire assembly for an inspection to find the cause of the low tire pressure.
- (b) Replace the wheel and tire installed on the opposite side of the axle.
 - 1) Mark on the tire that it was on the same axle with a wheel and tire assembly that was replaced because of low tire pressure.
 - 2) Send the tire for inspection for damage.

EFFECTIVITY

ALL

12-15-03

03

Page 319
Aug 22/05

TASK 12-15-03-613-006

3. Tire Servicing

A. Equipment

- (1) Tire Inflation Adapter - A12007-11

B. Consumable Materials

- (1) G01158 Nitrogen, Gaseous (Dry, Commercial Grade, 99.5 percent pure), from a pressure regulated source
- (2) Air - If nitrogen is not available, clean dry air with maximum moisture content that is equivalent to an atmospheric dew point of -20 degrees F (-29 degrees C), from a pressure regulated source

C. References

- (1) AMM 32-45-01/401, Main Gear Tires
(2) AMM 32-45-02/401, Nose Gear Tires

D. Access

- (1) Location Zones
- | | |
|-----|-------------------------|
| 711 | Nose Landing Gear |
| 731 | Left Main Landing Gear |
| 741 | Right Main Landing Gear |

E. Procedure to Find the necessary tire pressure (Fig. 301, Fig. 301A)

S 613-007

CAUTION: TO OPERATE AT A HIGHER GROSS WEIGHT, MAKE SURE YOU SERVICE THE TIRE TO THE PRESSURE THAT IS NECESSARY FOR THAT GROSS WEIGHT. ADJUST THE TIRE PRESSURE AS SHOWN IN THE TIRE PRESSURE LIMIT CHARTS. DAMAGE TO THE TIRES WILL OCCUR IF THE TIRE PRESSURE IS TOO LOW FOR THE AIRPLANE GROSS WEIGHT.

- (1) Use the Tire Pressure Limit charts to find the tire pressure for the airplane's maximum gross weight.

EFFECTIVITY

ALL

12-15-03

03

Page 320
Dec 22/05

S 613-008

- (2) If the airplane is usually operated at less than the maximum gross weight (for example, pilot training), you can lower the pressure as shown in the Tire Pressure Limit charts.

S 613-009

- (3) You can use the maximum pressure shown on the Tire Pressure Limit charts at all gross weights.

S 613-010

- (4) Use the same pressure in all of the main tires and the same pressure in all of the nose tires.

F. Tire Pressure Check

S 863-011

- (1) Let the tires cool for a minimum of 2 hours after a flight.

S 613-012

- (2) Do a check of the tire pressure with an accurate gage.

S 213-030

- (3) Do a check of the tire pressure of each tire with an accurate gage or the tire pressure indicating system (TPIS), if installed.

S 613-013

- (4) Compare the measured pressure with the tire pressure you found in the Find an Applicable Tire Pressure procedure.

S 613-014

- (5) Do the applicable steps that follow:
 - (a) If the measured tire pressure is less than the tire pressure found in the main and nose gear tire pressure limits charts (Fig. 301 and Fig. 302) by no more than 5 percent, inflate the tire to the pressure in the charts.
 - (b) If the tire pressure is between 5 percent and 10 percent less than the tire pressure found in the charts, do the steps that follow:

EFFECTIVITY

ALL

12-15-03

02

Page 321
Dec 22/03

WARNING: USE A REGULATED PRESSURE SOURCE TO SERVICE THE TIRES. AN UNREGULATED PRESSURE SOURCE CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

WARNING: THE SERVICING CART AND ALL PERSONNEL SHALL BE POSITIONED FORE OR AFT (TREAD SIDE) OF THE TIRE WHEN SERVICING TO PREVENT INJURIES, DEATH AND EQUIPMENT DAMAGE.

- 1) Inflate the tire to the necessary pressure.
- 2) Do a check of the pressure again after 24 hours.

CAUTION: TIRES THAT REQUIRE FREQUENT REFILLS TO MAINTAIN THE NOMINAL SERVICE PRESSURE ARE LIKELY TO HAVE A TREAD LOSS OR CARCASS RUPTURE IF THEY ARE LEFT IN SERVICE TOO LONG. THESE TIRES SHOULD BE REMOVED FROM SERVICE AS SOON AS POSSIBLE.

- 3) If the tire pressure is more than 5% below the necessary pressure again, replace the tire.
 - a) Remove the wheel and tire assembly (AMM 32-45-01/401, Main Gear; AMM 32-45-02/401, Nose Gear).
 - b) Send the wheel and tire assembly for an inspection to find the cause for the low tire pressure.
- (c) If the tire pressure is between 10% - 20% below the necessary tire pressure, do these steps:
 - 1) Replace the tire and wheel assembly.
 - a) Remove the tire and wheel assembly (AMM 32-45-01/401, Main Gear; AMM 32-45-02/401, Nose Gear).
 - b) Send the wheel and tire assembly for an inspection to find the cause for the low pressure.
- (d) If the tire pressure is more than 20% below the necessary tire pressure, do these steps:
 - 1) Replace the tire and wheel assembly.
 - a) Send the wheel and tire assembly for an inspection to find the cause for the low tire pressure.
 - 2) If the wheel and tire assembly has turned with the airplane weight on it after the pressure had decreased, replace the wheel and tire assembly installed on the opposite side of that axle.
 - a) Mark on the tire that it was on the same axle with a wheel and tire assembly that was replaced because of low tire pressure.

EFFECTIVITY

ALL

12-15-03

02

Page 322
Aug 22/06

- b) Send the tire for inspection for damage.
 - 3) Mark the reason for the tire removal on the tire to aid the inspectors when they examine the tire.
- G. Procedure to Initially Inflate a Tire

NOTE: Use the handheld pressure gage to measure the pressure when you inflate the tire.

S 613-027

WARNING: INITIALLY FILL THE TIRE WITH NITROGEN. A HOT TIRE THAT IS FILLED WITH AIR WILL MAKE EXPLOSIVE GASES. IF YOU FILL THE TIRE WITH AIR, AN EXPLOSION CAN OCCUR AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Use the instructions on the tire inflation tool and install the tool.

S 613-045

WARNING: USE A REGULATED PRESSURE SOURCE TO SERVICE THE TIRES. AN UNREGULATED PRESSURE SOURCE CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (2) Inflate the tire with nitrogen to the pressure shown on Figs. 301 and 302.

S 093-018

- (3) Remove the tire inflation tool.

H. Procedure to Add Nitrogen or Air to a Tire (Figs. 301 and 302)

S 613-023

- (1) If the volume of the oxygen in the tire will be more than 5 percent, fill the tire as follows:

NOTE: See the fill procedure in the steps that follow to calculate the volume of oxygen.

- (a) Deflate the tire to one atmosphere pressure.
- (b) Inflate the tire with the Initially Inflate the Tire procedure.

S 493-019

- (2) Install the tire inflation tool.

S 613-020

- (3) If nitrogen is available, fill the tire with nitrogen to the pressure that is necessary (Figs. 301 and 302).

EFFECTIVITY

ALL

12-15-03

02

Page 323
Apr 22/08

S 613-021

- (4) If nitrogen is not available,
fill the tire with air as shown in Procedure 1 or Procedure 2.

NOTE: You can use air when nitrogen is not available but you must obey this limit:

- The air that you add can not cause the volume of the oxygen in the tire to be more than 5 percent.
- To make sure that the oxygen does not become more than 5 percent, use one of the procedures that follow (Procedure 1 or Procedure 2):

- (a) Procedure 1:
Make a record of the quantity of the air that you add each time that you fill the tire. The sum of all the air refill pressures must not be more than 13 psi.

EXAMPLE: You can add one 6 psi and one 7 psi refill of air. Deflate the tire and inflate it with nitrogen when the it is necessary to increase the pressure again.

- (b) Procedure 2:
Make a record of the quantity of the air that you add each time that you fill the tire (for example, 5 psi, 8 psi, etc.). The sum of all the quantities of air that you add must not be more than the maximum quantity shown in Fig. 304.

EXAMPLE: For example, you initially inflate the tire to 165 psi with nitrogen. As shown in Fig. 304, the sum of all the quantities of air that you add can not be more than 30 psi. For example, you can add one 6 psi, one 14 psi, and two 5 psi refills. When it is necessary to add gas to the tire again, you must deflate the tire and inflate it with nitrogen.

S 093-022

- (5) Remove the tire inflation tool.

TASK 12-15-03-283-040

4. SAS 050-099, 155-999:
Tire Pressure Indicating System Accuracy Check

A. General

- (1) This check is a periodic maintenance requirement to ensure that the Tire Pressure Indicating System (TPIS) has the accuracy that is necessary so that it can be used to do the daily tire pressure check.

EFFECTIVITY

ALL

12-15-03

01

Page 324
Aug 22/06

B. Equipment

- (1) Gage - Tire Pressure, 0-300 psig with an accuracy of +/- 6 psi or better for tire inflation pressures of 100 to 230 psig.

C. References

- (1) AMM 32-45-00/501, Tire Pressure Indicating System

D. Access

- (1) Location Zones
- | | |
|-----|-------------------------|
| 711 | Nose Landing Gear |
| 731 | Left Main Landing Gear |
| 741 | Right Main Landing Gear |

E. Procedure

S 883-032

- (1) Let the tires cool for a minimum of 2 hours after a flight.

S 863-033

- (2) Use the Tire Pressure Indicating System (TPIS) to measure the tire pressures.

NOTE: The TPIS synoptic display is on the lower EICAS display.

S 973-034

- (3) Make a record of the tire pressure shown for each tire on the TPIS synoptic display on the EICAS.

S 283-042

- (4) Use the tire pressure gage to measure the tire pressure of each tire.

NOTE: The accuracy of the gage must be as given in the description of the pressure gage in the Equipment List.

S 783-035

- (5) Make sure that the tire pressure value shown for each tire on the TPIS is within +/-10 psi of the tire pressure value measured with the tire pressure gage for that tire.

S 783-036

- (6) If a tire pressure shown on the TPIS display is not within +/- 10 psi of the tire pressure measurement for the same tire with the tire pressure gage, do a test of the Tire Pressure Indicating System (AMM 32-45-00/501).

EFFECTIVITY

ALL

12-15-03

01

Page 325
Dec 22/03

PARKING BRAKE ACCUMULATOR – SERVICING

1. General

- A. The parking brake accumulator is filled with dry nitrogen to a pressure shown on the Fig. 301 placard. The charging valve for the accumulator and the pressure gage are found in the right wheel well for the main landing gear adjacent to the parking brake accumulator.

TASK 12-15-04-613-001

2. Fill the Parking Brake Accumulator

A. Equipment

- (1) Pressurized Nitrogen Source – Commercially Available

B. References

- (1) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
(2) AMM 32-00-15/201, Landing Gear Door Locks
(3) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

- (1) Location Zones
143/144 Main Landing Gear Wheel Well

D. Procedure

S 493-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 493-003

WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the right main landing gear and install the door locks (AMM 32-00-15/201).

S 863-004

- (3) Remove the pressure from the right and center hydraulic systems (AMM 29-11-00/201).

S 493-005

- (4) Put chocks on the landing gear wheels.

S 863-006

- (5) Release the parking brake, if it is set.

S 863-007

- (6) Operate the left and right brake pedals a minimum of ten times to remove the pressure from the brake system.

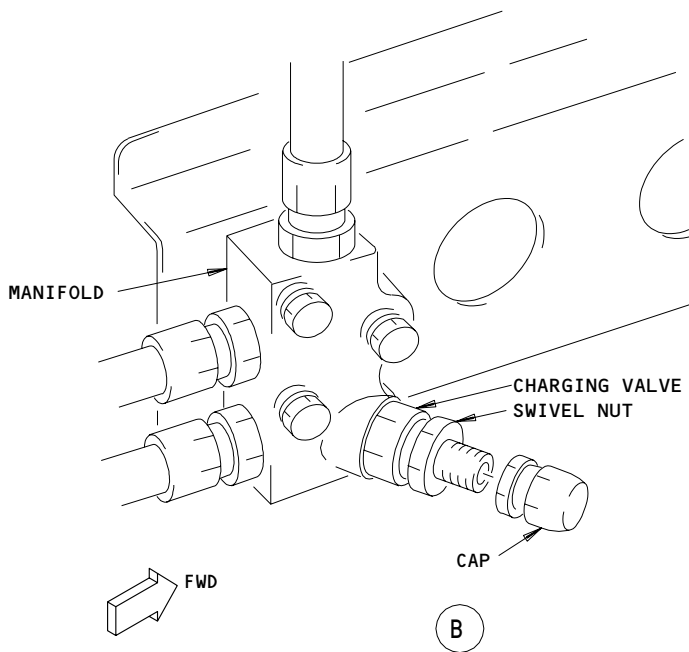
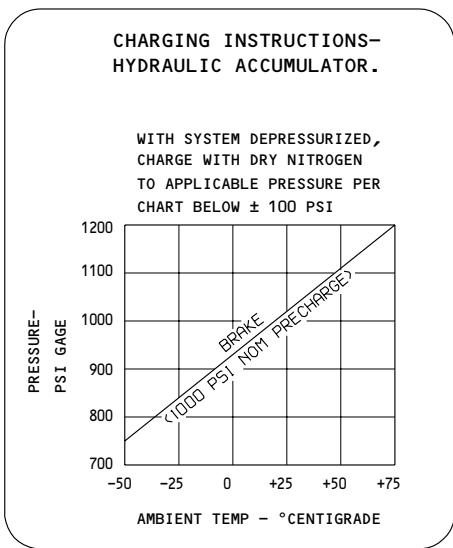
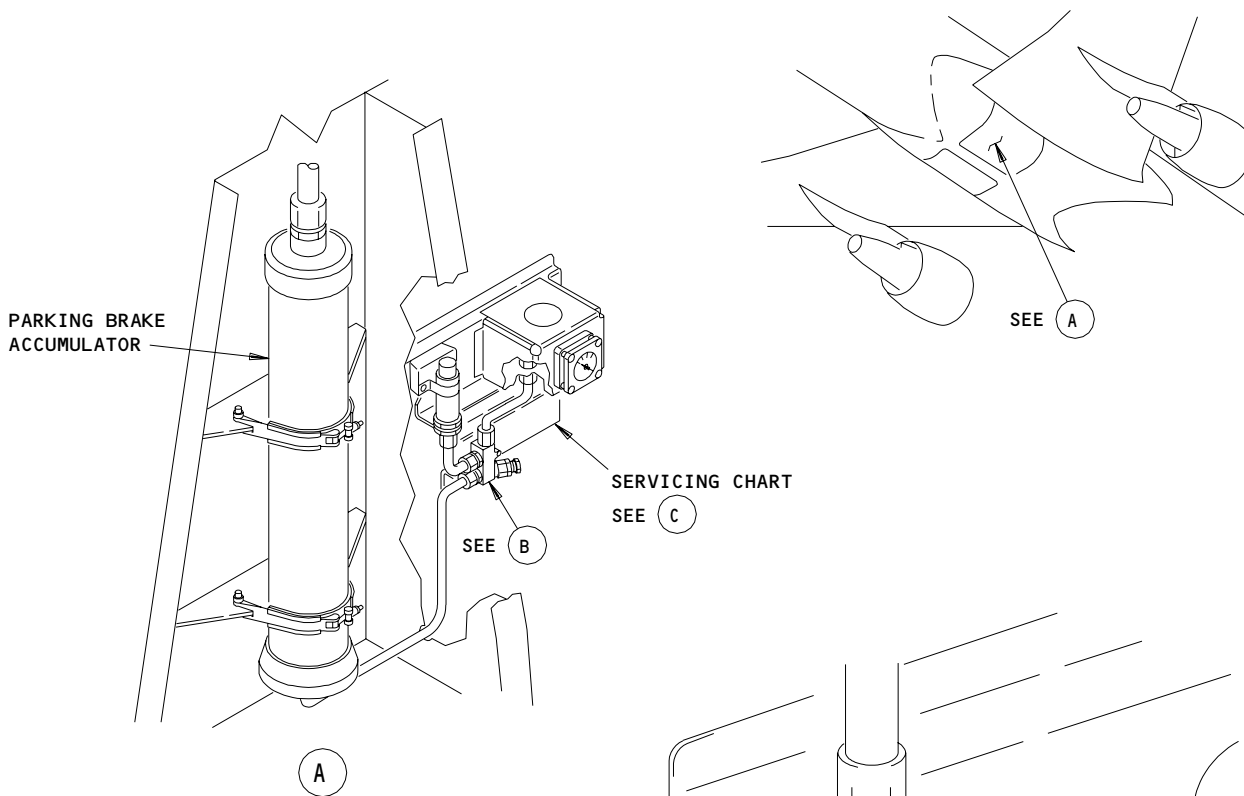
EFFECTIVITY

ALL

12-15-04

01

Page 301
Apr 22/07



Parking Brake Servicing Location
Figure 301

EFFECTIVITY

ALL

12-15-04

01

Page 302
Aug 01/82

S 863-008

- (7) Do a check of the pressure indication on the brake accumulator pressure gage, found adjacent to the charging valve, to see if it is in the correct precharge pressure range as shown on the placard (View C).

S 613-009

- (8) If the pressure shown is not in the correct precharge pressure range shown on the placard (View C), do the servicing of the accumulator with nitrogen as follows:
- (a) Operate the brake pedals until the pressure shown on the gage does not decrease any more.
 - (b) Remove the cap from the charging valve (Views A and B).
 - (c) Attach a nitrogen source to the charging valve.

WARNING: DO NOT LOOSEN THE CHARGING VALVE. THE INTERNAL PRESSURE CAN BLOW THE VALVE OUT AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (d) Loosen the swivel nut one turn.
- (e) Fill the accumulator to the pressure shown on the placard adjacent to the charging valve.

NOTE: If a large amount of charging with nitrogen is necessary, allow the accumulator pressure and temperature to stabilize for five minutes, and then do a check of the pressure again.

- (f) Tighten the swivel nut.
- (g) Operate the brake pedals again and make sure the accumulator pressure does not decrease.
 - 1) If the pressure decreases, continue to fill the accumulator to the pressure shown on the placard until operation of the brake pedals does not cause the pressure to decrease.
- (h) Remove the nitrogen source, and make sure there is no external leakage at charging valve.
- (i) Attach the cap to the charging valve.

S 093-010

WARNING: USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (9) Remove the door lock from the right main landing gear and close the door (AMM 32-00-15/201).

EFFECTIVITY

ALL

12-15-04

01

Page 303
Apr 22/99

TAIL SKID SHOCK STRUT/ACTUATOR – SERVICING

1. General

- A. This procedure gives the steps to pressurize the tail skid shock strut/actuator with dry air or nitrogen.
- B. A visual low pressure (pop-up) indicator is found on the lower end on the tail skid shock strut. The indicator extends when the shock strut pressure decreases to less than 175-230 psi.

TASK 12-15-05-603-019

2. Service the Shock Strut/Actuator for the Tail Skid

A. Equipment

- (1) Pressurization bottle (dry air or nitrogen) pressurized to 500 psi - commercially available
- (2) High pressure hose with fittings that fit the air valve and pressurization bottle - commercially available
- (3) Retractable Tail Skid Maintenance Lock - A32088-7
- (4) Strut Inflation Tool - F70200-14

B. References

- (1) 29-11-00/201, Pressurize/Depressurize Main Hydraulic System
- (2) 32-00-20/201, Landing Gear Downlocks

C. Access

- (1) Location Zones
 - 311 Area Aft of Pressure Bulkhead (Left)
 - 312 Area Aft of Pressure Bulkhead (Right)
- (2) Access Panel
 - 312AR Stabilizer/Trim Jackscrew Compartment Access Door

D. Prepare for Servicing (Fig. 301)

S 863-001

- (1) Make sure the downlocks are installed on the nose and main landing gear (Ref 32-00-20).

S 863-002

- (2) Make sure the tail skid is extended.

S 863-003

- (3) Make sure the pressure is removed from the center hydraulic system the reservoir (Ref 29-11-00).

S 863-004

- (4) Open this circuit breaker on the overhead circuit breaker panel P11 and attach DO-NOT-CLOSE tag:
 - (a) 11U26, TAIL SKID CONT

S 493-005

- (5) Install the maintenance lock for the retractable tail skid around the inner cylinder of the extended shock strut/actuator.

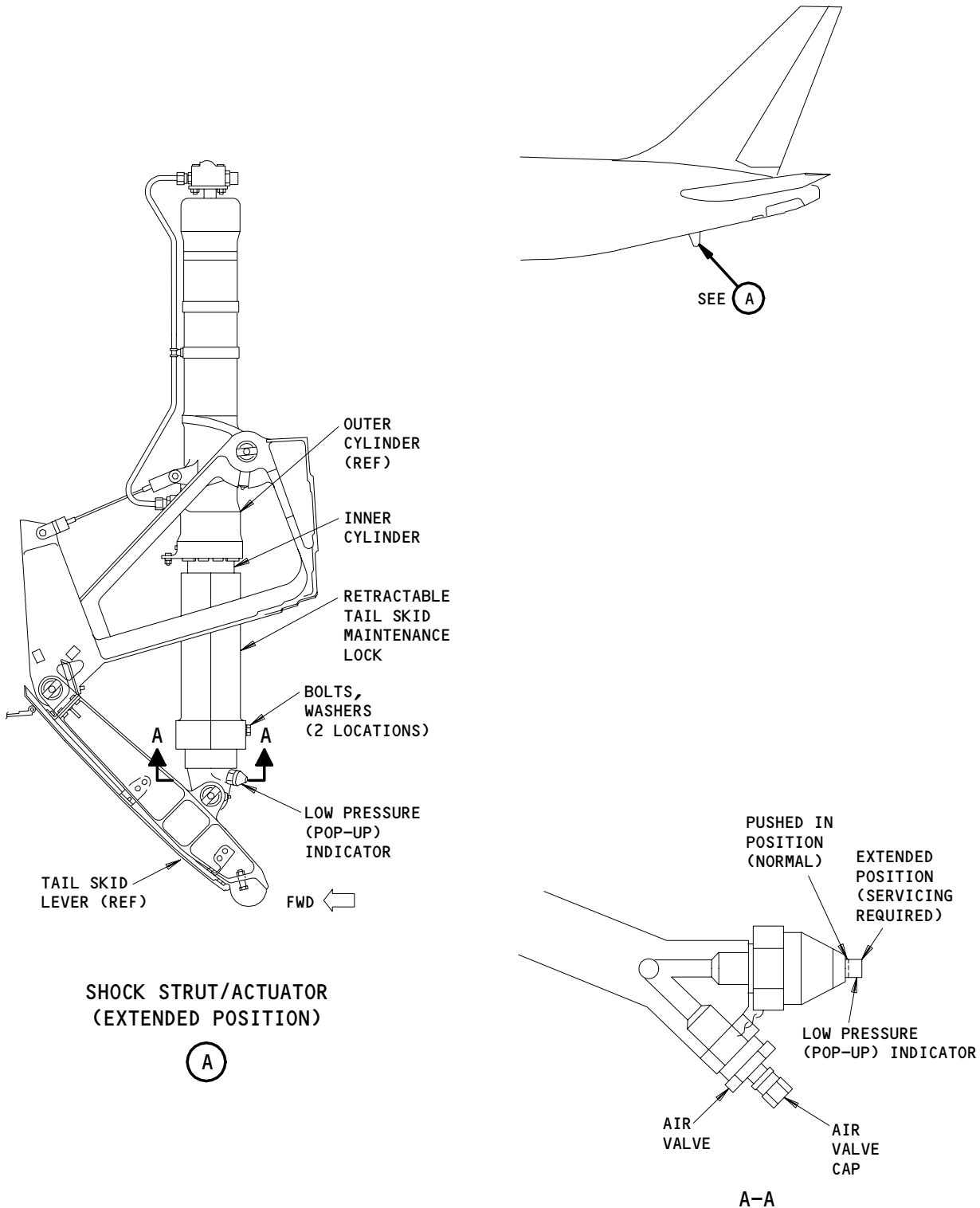
EFFECTIVITY

ALL

12-15-05

03

Page 301
Nov 10/95



Tail Skid Strut/Actuator Pressurization
Figure 301

EFFECTIVITY	ALL
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12-15-05

E. Service the Shock Strut/Actuator (Fig. 301)

S 033-006

- (1) Remove the cap from the air valve at the bottom of the shock strut/actuator.

S 493-020

CAUTION: IT IS RECOMMENDED THAT YOU USE A SEPARATE STRUT INFLATION TOOL TO INFLATE THE SHOCK STRUT/ACTUATOR. IF YOU DO NOT USE A SEPARATE TOOL, CONTAMINATION CAN CAUSE DETERIORATION OF THE SEALS IN THE SHOCK STRUT FOR THE TAIL SKID AND THE LANDING GEAR BECAUSE DIFFERENT FLUIDS ARE USED.

- (2) Install the air chuck assembly for the strut inflation tool on the air valve.

S 493-008

- (3) Connect the pressurization bottle (air source) to the inflation tool.

S 613-009

- (4) Inflate the shock strut/actuator with dry air or nitrogen to 450-500 psi.

S 613-010

- (5) Use the pressure gage on the inflation tool to measure the air pressure.

S 613-011

- (6) Push in the low pressure (pop-up) indicator button on the shock strut/actuator until it latches.

S 613-012

- (7) Decrease the pressure to 300-350 psi.

S 613-013

- (8) Do the steps above over again if the low pressure indicator button extends and will not latch when it is pushed in.

F. Put the Airplane Back to Its Usual Condition

S 093-014

- (1) Disconnect the pressurization bottle from the inflation tool.

S 093-015

- (2) Remove the inflation tool from the air valve.

S 433-016

- (3) Install the air valve cap on the shock strut/actuator.

EFFECTIVITY

ALL

12-15-05

03

Page 303
Nov 10/91

- S 093-017
- (4) Remove the tail skid maintenance lock from the inner cylinder of the shock strut/actuator.
- S 863-018
- (5) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- (a) 11U26, TAIL SKID CONT

EFFECTIVITY

ALL

12-15-05

03

Page 304
Nov 10/91

OXYGEN – SERVICING

1. General

A. The servicing procedure for the crew oxygen system gives instructions to remove unserviceable cylinders and install serviceable cylinders.

B. Oxygen Requirements

(1) The oxygen for use in airplanes must agree with these specifications:

NOTE: Oxygen that agrees with Specification MIL-0-27210, Type I, agrees with these specifications and is recommended. The quantity of water in the oxygen can be different as shown in S.A.E. (AS 1065).

- (a) It must contain not less than 99.5% oxygen by volume.
- (b) It must be free of poisonous contamination to the maximum level possible.
- (c) It must have less than 0.005 milligram of water in each liter. The water contents are measured at 70°F and a pressure of 760 millimeters of Hg.

C. Precaution Data

- (1) Before you do an oxygen servicing procedure, read the precautions and general maintenance instructions (AMM 35-00-00/201).
- (2) Make sure your hands, clothing, tools, the area, and the equipment are clean. They must be free of petroleum, oil and grease, hydraulic fluid, or dirt. Use only oxygen clean components in the oxygen system

NOTE: Oxygen clean fittings come from a sealed package labeled for oxygen clean fittings. Some fittings used in the oxygen system are the same as fittings in other systems and are not oxygen clean. If it is necessary to clean parts, use the applicable oxygen procedures to clean the parts. This also applies to tube caps or plugs which must be as clean as the installation connections.

(3) Keep oxygen away from all sources of ignition.

NOTE: Heat, flame, and smoking are examples of ignition sources.

(4) Do not let the oxygen mix with other gases, fumes, or flammable materials.

EFFECTIVITY

ALL

12-15-08

03

Page 301
Apr 22/07

- (5) Use only oxygen that is satisfactory to breathe in an airplane.

NOTE: Oxygen used in hospitals or for welding is satisfactory to breathe, but it can contain too much water. The water can freeze and stop the flow in the lines, regulators, and valves.

WARNING: YOU MUST OPEN THE SHUTOFF VALVE SLOWLY, OR HIGH TEMPERATURES CAN OCCUR. THIS CAN START AN IGNITION WITH THE OXYGEN AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO THE EQUIPMENT.

- (6) Open all the oxygen valves slowly. This will decrease the risk of a fire.

TASK 12-15-08-603-001

2. Crew Oxygen System Servicing (Cylinder Replacement) (Fig. 301)

A. General

- (1) Read and obey the Oxygen - Maintenance Practices procedures (AMM 35-00-00/201).
- (2) The crew oxygen cylinder is on the right sidewall of the forward E/E compartment.
- (3) Put a workstand below the access door to the E/E compartment for better access to the oxygen cylinder.
- (4) Steel oxygen cylinder and composite oxygen cylinder may be used interchangeably on the same cylinder support structure.

B. Equipment

- (1) Caps and Plugs - Clean, for oxygen system ports and open lines
- (2) Oxygen Cylinders - Full and Serviceable

C. Consumable Materials

- (1) G00092 Oxygen System Leak Detection Compound
- (2) G02479 Lockwire - Copper (0.020 inch Diameter) (NASM20995CY20)

D. References

- (1) AMM 20-10-23/401, Lockwires
- (2) AMM 20-11-00/201, Standard Torque Values
- (3) AMM 20-41-00/201, Static Grounding
- (4) AMM 35-00-00/201, Oxygen

E. Access

- (1) Location Zones
120 Main Equipment Center (Right)
- (2) Access Panel
119AL Main Equipment Center

F. Procedure - Prepare to Remove the Crew Oxygen Cylinder

EFFECTIVITY

ALL

12-15-08

02

Page 302
Apr 22/07

S 863-167

WARNING: DURING THE SERVICING PROCEDURES OF THE CREW OXYGEN SYSTEM, MAKE SURE THAT THE AIRCRAFT AND OXYGEN CART IS CORRECTLY GROUNDED. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Make sure the airplane is correctly grounded (AMM 20-41-00/201).
- G. Procedure - Remove the Crew Oxygen Cylinder

S 863-147

CAUTION: DO NOT TIGHTEN THE SHUTOFF VALVE MORE THAN 25 INCH-POUNDS (3 NEWTON METERS). TOO MUCH TORQUE CAN CAUSE DAMAGE TO THE SHUTOFF VALVE.

- (1) Close the shutoff valve for the crew oxygen cylinder slowly.

NOTE: The shutoff valve can be tightened by hand which is equivalent to 25 pound-inches.

S 333-148

WARNING: LOOSEN THE CONNECTION SLOWLY. THE REMAINING OXYGEN CAN RELEASE WITH A LARGE FORCE, AND CAUSE THE TEMPERATURE TO INCREASE. HEAT AND OXYGEN CAN CAUSE A FIRE. INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) Slowly loosen the coupling nut or B-nut, that attaches the cylinder to the regulator, to bleed out the pressure. Then, fully disconnect the cylinder.

S 033-003

- (3) OXY. CYL. VALVE ASSY'S. WITH OVERBOARD DISCHARGE LINE ATTACHED; Hold the union with a wrench, and disconnect the B-nut that attaches the overboard discharge line to the union at the oxygen cylinder valve assembly.
 - (a) Remove the union from the oxygen cylinder valve assembly. Remove the packing from the union. Keep the union. The union is used to install the oxygen cylinder.

S 023-004

- (4) AIRPLANES WITH REAR-ENTRY CYLINDER;
Do these steps:
 - (a) Remove T-bolt nut.
 - (b) Turn the forward retaining ring in the forward direction.
 - (c) Pull the oxygen cylinder forward to remove it.

NOTE: The oxygen cylinder weighs between 35 and 43 pounds.

EFFECTIVITY

ALL

12-15-08

02

Page 303
Aug 22/07

S 023-124

- (5) AIRPLANES WITH FORWARD-ENTRY CYLINDER;

Do these steps:

- (a) Remove each safety pin from the over-center clamps.
- (b) Unclasp the over-center clamps.
- (c) Pull the oxygen cylinder in the aft direction to remove it.

NOTE: The oxygen cylinder weighs between 35 and 43 pounds.

S 413-149

WARNING: USE ONLY CLEAN COMPONENTS THAT COME FROM A SEALED BAG. MAKE SURE THAT THE LABEL ON THE BAG IDENTIFIES THE COMPONENTS AS SUFFICIENTLY CLEAN FOR THE OXYGEN SYSTEM. CONTAMINATION ON COMPONENTS CAN CAUSE A FIRE OR AN EXPLOSION. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- (6) Install caps on the oxygen cylinder port and the open lines to prevent contamination of the system (AMM 35-00-00/201).

NOTE: Oxygen clean fittings come from a sealed package labeled for oxygen system installation. Make sure that you use only oxygen clean fittings. Some fittings used in the oxygen system are the same as fittings in other systems and are not oxygen clean. If it is necessary to clean parts, use the applicable oxygen procedures to clean the parts. This also applies to tube caps or plugs which must be as clean as the installation connections.

S 493-150

- (7) When you remove a cylinder with a metal valve-seat in the shutoff valve, you will find a cap. A chain holds the cap to the valve. Install this cap on the inlet/outlet line and tighten it to 350-400 inch pounds.

NOTE: IF YOU DO NOT TIGHTEN THE CAP CORRECTLY, THE CYLINDER PRESSURE CAN DECREASE.

H. Procedure - Install the Crew Oxygen Cylinder

S 913-045

WARNING: OBEY THE DATA IN THE CREW OXYGEN SYSTEM-MAINTENANCE PRACTICES PROCEDURES. IF YOU DO NOT OBEY THIS DATA, A FIRE OR EXPLOSION CAN EASILY OCCUR.

- (1) Read and obey the Oxygen - Maintenance Practices procedures (AMM 35-00-00/201).

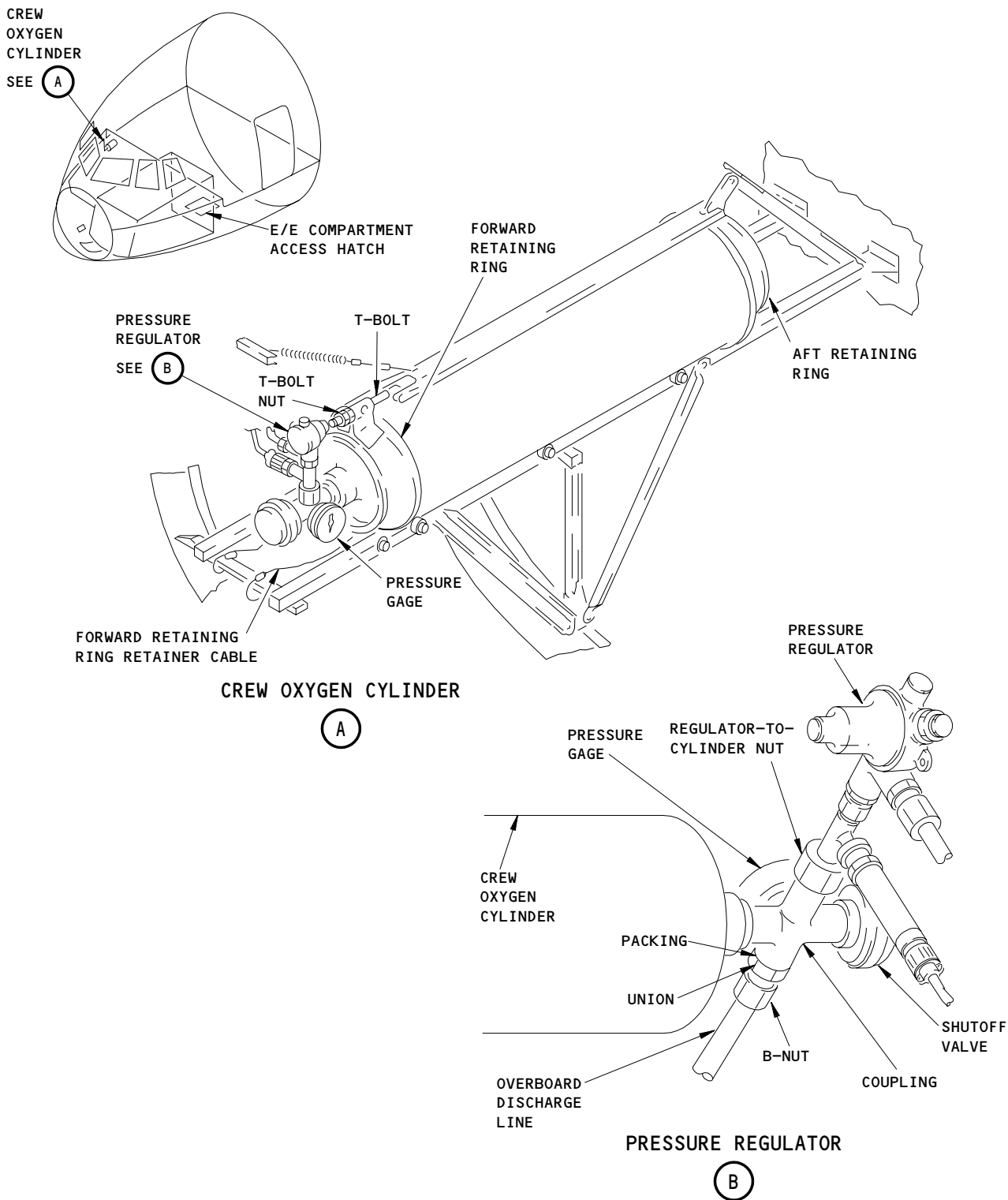
EFFECTIVITY

ALL

12-15-08

02

Page 304
Aug 22/08



Crew Oxygen System Servicing
Figure 301

EFFECTIVITY	
	ALL

12-15-08

S 493-151

WARNING: DURING THE SERVICING PROCEDURES OF THE CREW OXYGEN SYSTEM, MAKE SURE THAT THE AIRCRAFT AND OXYGEN CART IS CORRECTLY GROUNDED. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) Make sure the airplane is correctly grounded (AMM 20-41-00/201).

S 213-120

- (3) Make sure that the oxygen cylinder hydrostatic test date complies with current regulations.

NOTE: The hydrostatic test date must be within the prescribed service life limit. The service life limit is established by national regulatory authorities, the cylinder manufacturer, and/or the airline.

NOTE: The last hydrostatic test date will be on a label near the top of the oxygen cylinder.

S 033-153

- (4) Remove all the lockwire or cotter pins that hold the cap on the oxygen cylinder.

S 033-152

WARNING: LOOSEN THE CONNECTION SLOWLY. THE REMAINING OXYGEN CAN RELEASE WITH A LARGE FORCE, AND CAUSE THE TEMPERATURE TO INCREASE. HEAT AND OXYGEN CAN CAUSE A FIRE. INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (5) Slowly turn the cap to bleed out the gas and then fully remove the cap.

NOTE: There are pressure-type caps for the oxygen cylinders with metal valve-seats in the shutoff valves. They are usually held to the cylinder with chains. Do not cut or remove these chains.

EFFECTIVITY

ALL

12-15-08

06

Page 306
Aug 22/08

- S 213-036
- (6) Examine the fittings and the threads to make sure they are all clean and serviceable.
- S 033-009
- (7) Remove the caps from the oxygen cylinder ports and airplane lines.
- S 423-125
- (8) AIRPLANES WITH REAR-ENTRY CYLINDER;
Do these steps:
- (a) Put the oxygen cylinder on the rollers.
 - (b) Push the cylinder in the aft direction until it touches the aft retaining ring.
 - (c) Put the forward retaining ring in its position above the forward end of the oxygen cylinder.
 - (d) Install and tighten the T-bolt nut to the applicable torque value (AMM 20-11-00/201).

NOTE: Make sure the T-bolt holds the crew oxygen cylinder tightly to prevent all forward or aft movement.

- S 023-126
- (9) AIRPLANES WITH FORWARD-ENTRY CYLINDER;
Do these steps:
- (a) Put the oxygen cylinder in its place.
 - (b) Push the cylinder in the forward direction until it touches the forward retaining ring.
 - (c) Put the restraints in their position.
 - (d) Close the over-center clamps.
 - (e) Install the safety pins in the over-center clamps.

S 423-012

WARNING: DO NOT USE LUBRICANTS OR GASKETS WHEN YOU CONNECT THE FITTINGS IN THE OXYGEN SYSTEM. THE GASKETS OR LUBRICANTS CAN CAUSE A FIRE OR AN EXPLOSION WHEN THEY ARE NEAR PRESSURIZED OXYGEN. THIS CAN CAUSE DAMAGE TO EQUIPMENT OR INJURIES TO PERSONS

- (10) OXY. CYL. VALVE ASSY'S. WITH OVERBOARD DISCHARGE LINE ATTACHED;
Put a new packing on the union, and install the union in the oxygen cylinder valve assembly. Connect the overboard discharge line to the union, and tighten the union (AMM 20-11-00/201).

EFFECTIVITY

ALL

12-15-08

02

Page 307
Aug 22/08

S 423-169

- (11) Do these steps to connect the lines:
(a) Connect the nut that attaches the cylinder to the regulator and tighten it to 650-700 pound-inches.

S 863-013

- (12) Supply electrical power (AMM 24-22-00/201).

S 863-048

- (13) Make sure this circuit breaker on the overhead circuit breaker panel, P11, is closed:
(a) 11U29, OXYGEN PRESSURE

S 863-014

WARNING: YOU MUST OPEN THE SHUTOFF VALVES SLOWLY, OR HIGH TEMPERATURES CAN OCCUR. THIS CAN START AN IGNITION WITH THE OXYGEN AND CAN CAUSE INJURY TO PERSONS AND DAMAGE THE EQUIPMENT.

CAUTION: DO NOT TIGHTEN THE SHUTOFF VALVE ON EACH OXYGEN CYLINDER MORE THAN 25 INCH POUNDS (3 NEWTON METERS). TOO MUCH TORQUE CAN CAUSE DAMAGE TO THE SHUTOFF VALVE.

- (14) Slowly turn the shutoff valve for the oxygen cylinder to the fully open position. Then, turn the shutoff valve 1/4-turn in the opposite direction.

NOTE: Do not apply more than 25 pound-inches of torque. Use only your hand to turn the shutoff valve.

S 433-069

- (15) Install the inspection wire to show the valve in this position.

NOTE: Use the 0.020 inch diameter cad/copper lockwire (AMM 20-10-23/401).

EFFECTIVITY

ALL

12-15-08

06

Page 308
Aug 22/08

S 793-039

- (16) Do a leak check on the oxygen cylinder couplings with the leak detection compound.

S 793-053

- (17) Remove the leak detection compound with a clean cloth immediately after you do the leakage check.

S 213-162

- (18) Immediately compare the pressure shown on the EICAS status page and the pressure shown on the cylinder gage.

NOTE: The difference of the pressure values must be less than 100 psi.

S 433-016

- (19) For cylinders with a pressure cap held by a chain, install the lockwire on the cap to decrease its movement.

I. Put the Airplane Back to Its Usual Condition

S 863-054

- (1) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

S 413-015

- (2) Close the access door for the oxygen cylinder.

J. System Operational Check

S 013-127

- (1) Gain access to the Crew Oxygen Mask Regulator in the flight deck (FIG 301).

S 443-128

- (2) Press and hold the test lever or button for 10 seconds.

EFFECTIVITY

ALL

12-15-08

11

Page 309
Aug 22/08

S 213-129

- (3) Make sure the pressure on the oxygen pressure indicator does not drop more than 100 psig.

NOTE: If there is a pressure drop of 100 psig, or a slow recovery of indicated pressure, verify the cylinder is in the full open position.

S 203-130

- (4) Make sure there is an audible release.

S 213-142

- (5) Make sure the safety button is set to the Emergency Position.

NOTE: Rotate the lever clockwise to set it to the Emergency Position.

S 043-132

- (6) Press and hold the Reset Test lever in the direction of the arrow.

EFFECTIVITY

ALL

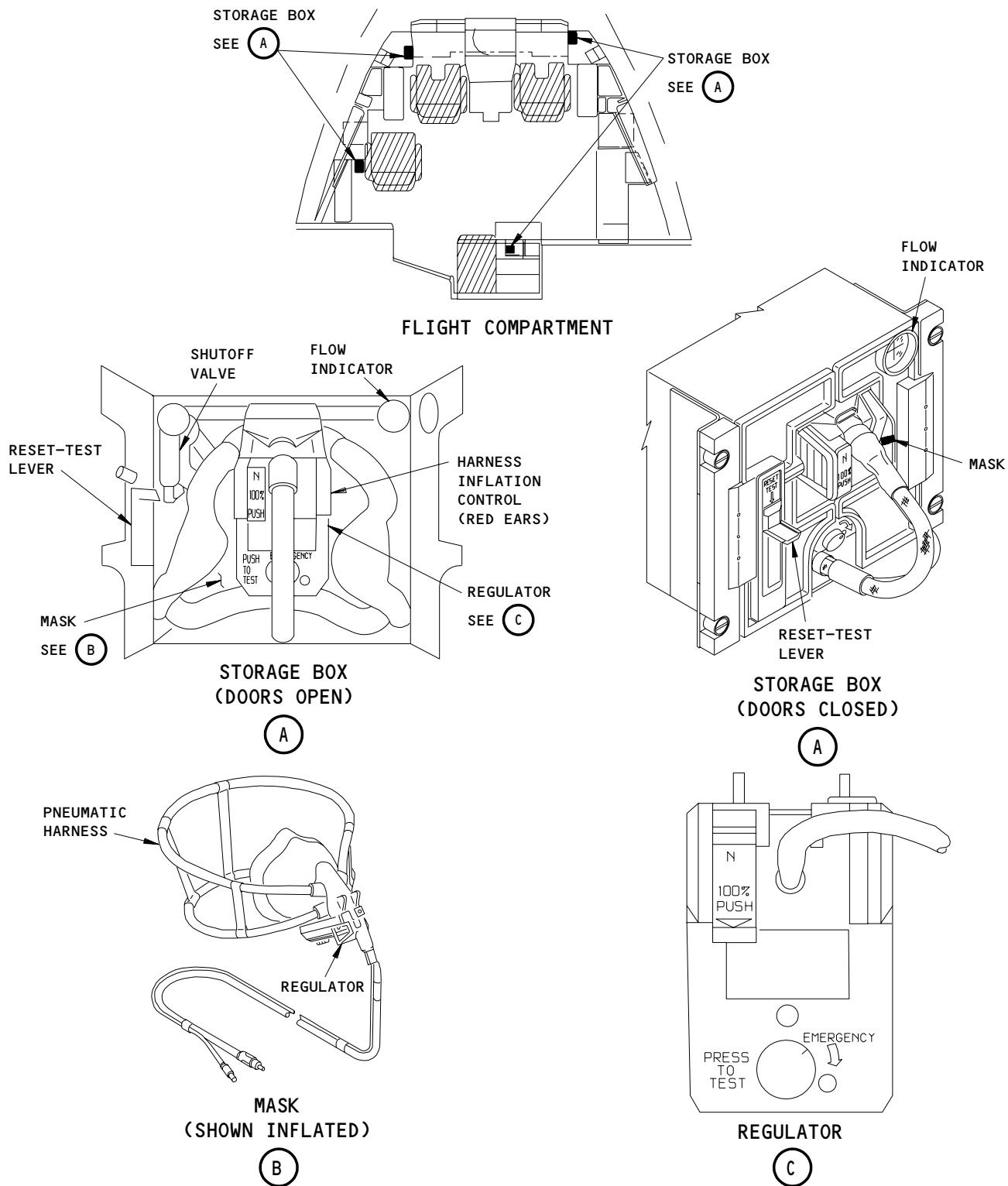
12-15-08

16

Page 310
Aug 22/08

BOEING

767 MAINTENANCE MANUAL



Crew Oxygen Masks
Figure 302

EFFECTIVITY ————
ALL

12-15-08

01

Page 311
Aug 22/05

BRAKE HYDRAULIC SYSTEM SURGE ACCUMULATOR – SERVICING

1. General

- A. This procedure contains instructions for the servicing of the surge accumulator for the brake hydraulic system.

TASK 12-15-09-613-001

2. Servicing of the Surge Accumulator for the Brake Hydraulic System (Fig. 301)

A. Equipment

- (1) Pressurized Nitrogen Source

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
(2) AMM 29-11-00/201, Pressurize/Depressurize Main Hydraulic System
(3) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

- (1) Access Panel
- | | |
|-------|------------|
| 551UB | Left Wing |
| 552CB | Left Wing |
| 651UB | Right Wing |
| 652CB | Right Wing |

D. Prepare for the Servicing

S 493-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

E. Do the Servicing of the Surge Accumulator

S 863-004

- (1) Release the parking brake.

S 863-005

- (2) Remove the pressure from the right and center hydraulic systems (AMM 29-11-00/201).

S 863-006

- (3) Operate the left and right brake pedals a minimum of seven times to remove the pressure from the brake system.

EFFECTIVITY

ALL

12-15-09

02

Page 301
Apr 22/99

S 013-007

- (4) Get access to the accumulator charging valve through the trunnion doors and the access panels as shown in Fig. 301 (AMM 06-44-00/201).

S 033-008

- (5) Remove the cap from the charging valve (Detail B).

S 493-009

- (6) Attach a dry nitrogen source.

S 033-010

WARNING: DO NOT LOOSEN THE CHARGING VALVE. THE INTERNAL PRESSURE CAN BLOW THE VALVE OUT, AND THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: USE A REGULATED PRESSURE SOURCE TO SERVICE THE ACCUMULATOR. AN UNREGULATED PRESSURE SOURCE CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (7) Loosen the swivel hex nut on the charging valve one turn.

S 613-011

- (8) Do the servicing of the accumulator to the pressure shown on the chart (Detail C) adjacent to the charging valve.

S 433-012

- (9) Tighten the swivel hex nut.

S 093-013

- (10) Remove the nitrogen source.

S 433-014

- (11) Install the cap on the charging valve.

S 863-015

- (12) Set the parking brake.

EFFECTIVITY

ALL

12-15-09

02

Page 302
Dec 22/00

- S 413-017
(13) Install the access panels that were removed (AMM 06-44-00/201).

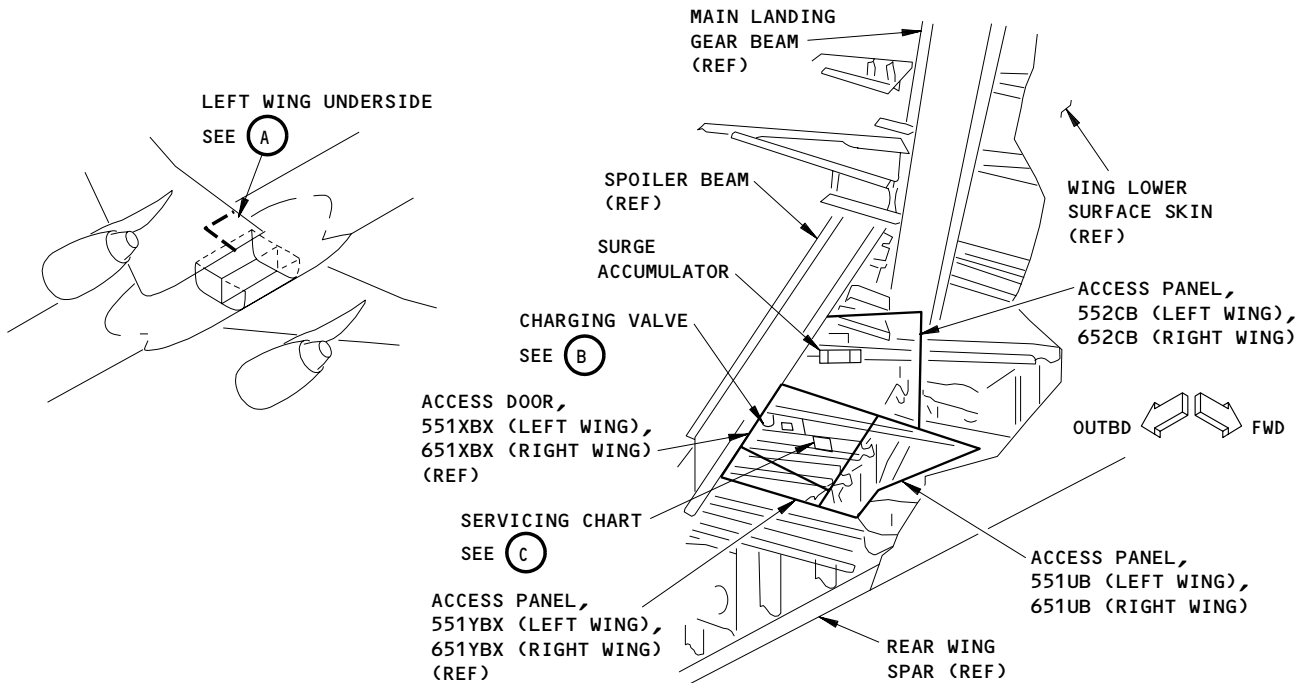
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ALL

12-15-09

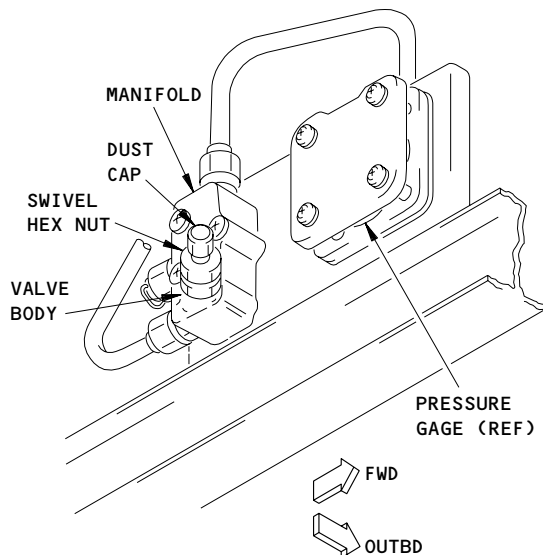
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Page 303
Apr 22/99



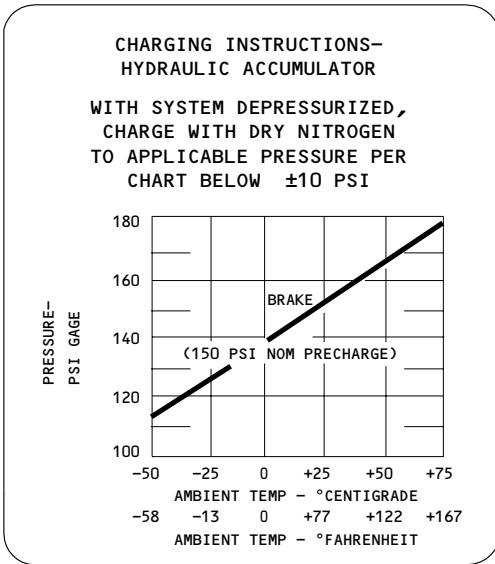
**LEFT WING UNDERSIDE
(RIGHT WING UNDERSIDE IS EQUIVALENT)**

(A)



CHARGING VALVE

(B)



SERVICING CHART

(C)

**Brake Hydraulic System Surge Accumulator Servicing
Figure 301**

EFFECTIVITY	ALL
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12-15-09

LANDING GEAR SHOCK STRUT FLUIDS – SERVICING

1. General

- A. This procedure contains a description of the fluids that are used to service the shock strut.

TASK 12-15-11-613-017

2. Landing Gear Shock Strut Fluids

A. General

- (1) All of the fluids that are listed here are compatible. Use any of these fluids to top off the strut even if the strut was originally filled with one of the other fluids.
- (2) It is not necessary to change the seals in the shock strut if you drained the strut and filled it with one of the other fluids.
- (3) It is recommended to use the pre-mixed fluid, BMS 3-32 Type I and Type II, if it is available. This is more convenient for the operator and will remove the possibility of error that can occur when the operator mixes the MIL-H-6083 or MIL-H-5606 fluids with a lubricant.
- (4) Use BMS 3-32, Type I to fill the shock strut for the first time when new, or after overhaul. The Type I fluid contains a corrosion inhibitor.
- (5) Use BMS 3-32, Type I or Type II, at the operator's discretion, for subsequent refills or to top off the strut. These two types of fluid are compatible.
- (6) If the BMS 3-32 is not available, you can use MIL-H-6083 or MIL-H-5606 fluid without lubricants to top off the strut. Try not to do this too often because the lubricant that is already in the strut will become more diluted. This will make the fluid less effective.
- (7) The shock strut fluid must contain a lubricant to be effective in service. Lubrizol 1395 and methyl oleate are heavy duty lubricants. They are added to the fluid to reduce the wear on the parts of the shock strut that move.
- (8) If the BMS 3-32 is not available, and you need to fill an empty shock strut, it is recommended that you pre-mix the MIL-H-6083 or MIL-H-5606 fluid with the lubricants before you add the fluid to the strut. If this is not possible, you can pre-mix 1 part lubricant with 10 parts (minimum) fluid before you add the lubricant into the shock strut.
- (9) Recommended (Pre-Mixed) Shock Strut Fluids
 - (a) BMS 3-32, Type I - This is MIL-H-6083 fluid pre-mixed with 1.5 percent by volume of Lubrizol 1395 and 1 percent by volume of methyl oleate.

EFFECTIVITY

ALL

12-15-11

01

Page 301
Apr 22/05

- (b) BMS 3-32, Type II - This is MIL-H-5606 fluid pre-mixed with 1.5 percent by volume of Lubrizol 1395 and 1 percent by volume of methyl oleate.
- (10) Alternative (Not Pre-Mixed) Shock Strut Fluids
 - (a) MIL-H-6083 fluid plus 2.4 percent by volume of Lubrizol 1395 - This mixture can be made from any approved source for MIL-H-6083 and mixed with 2.4 percent by volume of Lubrizol 1395 (41:1 ratio).

NOTE: Operators can choose to add 1.5 percent by volume of Lubrizol 1395 and 1 percent by volume of methyl oleate instead of 2.4 percent by volume of Lubrizol 1395.

- (b) MIL-H-5606 fluid plus 2.4 percent by volume of Lubrizol 1395 - This mixture can be made from any approved source for MIL-H-5606 and mixed with 2.4 percent by volume of Lubrizol 1395 (41:1 ratio).

NOTE: Operators can choose to add 1.5 percent by volume of Lubrizol 1395 and 1 percent by volume of methyl oleate instead of 2.4 percent by volume of Lubrizol 1395.

(11) Shock Strut Fluid Precautions

- (a) Do not add undiluted lubrizol directly into the shock strut. If you put undiluted lubrizol into a strut it will collect at the bottom and not mix correctly with the fluid. Undiluted lubrizol can cause the strut seals to expand and become soft, which will reduce the service life of the seals.
- (b) To add lubrizol directly into the shock strut, the lubrizol must be pre-mixed with shock strut fluid. You must mix 1 part of lubrizol with 10 parts (minimum) of shock strut fluid before you put the lubrizol into the shock strut.
- (c) When it is necessary to top off the shock strut with fluid. Do not add small quantities of hydraulic fluid without lubrizol many times. This can decrease the lubricity of the fluid in the strut which can cause damage to the strut.

EFFECTIVITY

ALL

12-15-11

01

Page 302
Aug 22/04

RAIN REPELLENT BOTTLE - SERVICING

1. General

- A. The rain repellent bottle is on the wall that is aft of the first observers seat.
 - (1) The fluid in the container P/N 10-38196-5 has a citric scent.
- B. You must replace the rain repellent bottle when you find the indications that follow:
 - (1) The repellent level float is below the bottle replacement level indicator.
 - (2) The pressure gage shows pressure in the yellow REPLACE band.

TASK 12-16-01-613-002

2. Service the Rain Repellent Bottle (Fig. 301)

A. Access

- (1) Location Zone
211 Control Cabin - Section 41 (Left)

B. Procedure

S 863-011

- (1) Turn the manual shutoff valve handle to the closed (horizontal) position.

S 033-001

WARNING: DO NOT LET THE RAIN REPELLENT FLUID TOUCH YOUR SKIN OR EYES. THE FLUID CAN CAUSE IRRITATION. DO NOT BREATHE THE FUMES. IF THE FLUID TOUCHES YOU, WASH YOUR SKIN OR EYES WITH WATER.

- (2) Release the bottle clamp.

S 023-004

- (3) Remove the bottle from the receptacle.

S 213-005

- (4) Examine the bottle seat and the O-ring for damage.

S 423-006

CAUTION: TIGHTEN THE RAIN REPELLENT BOTTLE WITH YOUR HAND ONLY. TOO MUCH TORQUE CAN CAUSE A LEAK.

- (5) Install the new bottle on the receptacle. Tighten the bottle with your hand.

S 433-007

- (6) Tighten the bottle clamp.

S 863-008

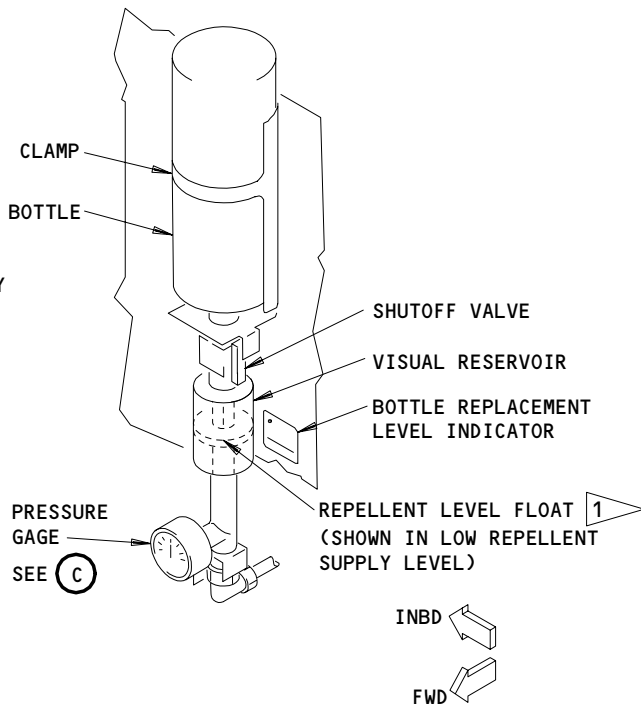
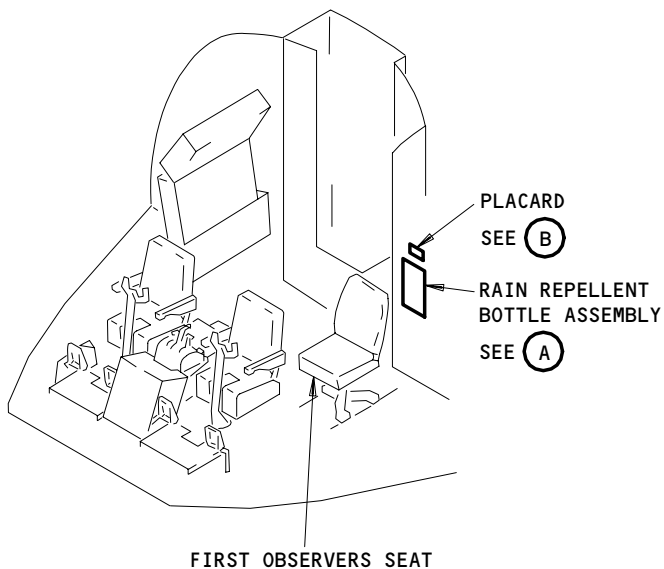
- (7) Turn the manual shutoff valve to the open (vertical) position.

EFFECTIVITY
AIRPLANES WITH RAIN REPELLENT SYSTEM

12-16-01

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Page 301
Aug 10/98



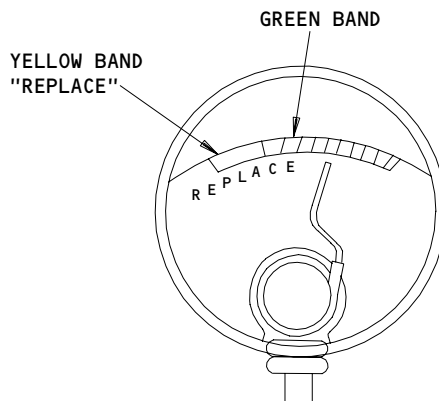
RAIN REPELLENT BOTTLE ASSEMBLY

(A)

CAUTION
TIGHTEN RAIN REPELLENT CAN INTO SYSTEM FINGER TIGHT. TORQUE IS NOT REQUIRED FOR SEALING. EXCESSIVE TORQUE MAY CAUSE LEAKAGE.
BAC27TFDE0022

PLACARD

(B)



PRESSURE GAGE

(C)

1 WHEN RESERVOIR IS EMPTY, YOU CAN SEE THE FLOAT AT THE BOTTOM OF THE RESERVOIR. WHEN THE RESERVOIR IS FULL, YOU CAN SEE THE FLOAT AT THE TOP OF THE RESERVOIR

Rain Repellent Bottle
Figure 301

EFFECTIVITY
AIRPLANES WITH RAIN REPELLENT SYSTEM

12-16-01

- S 213-009
- (8) Make sure the pressure gage shows in green band.
- S 213-010
- (9) Make sure the repellent level float is at the top of the visual reservoir.

EFFECTIVITY
AIRPLANES WITH RAIN REPELLENT SYSTEM

12-16-01

01

Page 303
Aug 10/98

FLIGHT COMPARTMENT WINDOWS – SERVICING

1. General

- A. This procedure contains these tasks:
- (1) The cleaning of the No. 1, No. 2, and No. 3 windows.
 - (2) The application of wax on the No. 2 and No. 3 windows (acrylic windows only) .
- B. For non-hydrophobic coated windows you can use castile soap or a 50/50 mix of isopropyl alcohol and de-ionized water.

TASK 12-16-02-103-002

2. Clean the Windows

- A. Consumable Materials
- (1) G01989 Castile Soap
 - (2) B00106 Chamois – Spec. KK-C-300 Oil Tan
 - (3) G01991 Rain Repellent Residue Remover Pad – Leeder 275-G
 - (4) B00130 Alcohol, Isopropyl – TT-I-735
 - (5) G02418 Water – De-ionized
- B. Access
- (1) Location Zones
211/212 Control Cabin – Section 41 (Left/Right)
- C. Procedure – Clean the Windows

S 103-010

CAUTION: DO NOT USE ABRASIVE CLEANERS OR CLEANERS THAT CONTAIN FLUORIDES ON HYDROPHOBIC COATED WINDOWS. THE USE OF THESE CLEANERS WILL REMOVE THE HYDROPHOBIC COATING.

- (1) Do the steps that follow to clean the No. 1 windows:

WARNING: MAKE SURE THE WINDOW HEAT SWITCHES ARE IN THE OFF POSITION, AND THAT THE WINDOW HEAT INOP LIGHTS ARE ON. FAILURE TO OBEY CAN RESULT IN AN ELECTRICAL SHOCK WHEN YOU TOUCH THE WINDOW.

- (a) Put the LEFT FWD, LEFT SIDE, RIGHT FWD and RIGHT SIDE WINDOW HEAT switches on the pilot's overhead panel, P5 to the OFF position. Attach DO-NOT-OPERATE tags to the switches.
- (b) Make sure the WINDOW HEAT INOP lights are on.

EFFECTIVITY

ALL

12-16-02

02

Page 301
Dec 22/08

- (c) For hydrophobic coated No. 1 windows do the step that follows:

NOTE: Hydrophobic coated windows will be identified with the words HYDROPHOBIC COATED WINDSHIELD next to the window part number.

- 1) Use a cloth, B00106 to apply a 50/50 % solution of alcohol, B00130 and de-ionized water, G02418 to the inner and outer surfaces of the windows.

NOTE: It is also acceptable to clean the windows with Castile Soap, G01989, and de-ionized water, G02418.

- (d) For non-hydrophobic coated No. 1 windows do the steps that follow:

NOTE: Hydrophobic coated windows will be identified with the words HYDROPHOBIC COATED WINDSHIELD next to the window part number.

- (e) Clean the window with the minimum necessary pressure.

NOTE: If hardened rain repellent stains remain on the windshield or windows after normal washing, they may be removed with Brasso applied sparingly on a damp flannel cloth. Use as light a rubbing pressure as possible to avoid application of Brasso to the bare edges of the window where it could promote delamination.

- (f) If there is dried rain repellent on the windows, remove the rain repellent with a residue remover pad, Leeder 275-G.

NOTE: The Rain Repellent Residue Remover Pad may not be available in all areas.

- (g) If the rain repellent stays on the windows, use the rain repellent as a solvent with a moist cloth and water.

NOTE: Use the rain repellent from the rain repellent system.

- (h) Flush the window with clean water and dry it with a clean, moist chamois.

- (i) If you used the rain repellent as a solvent, make sure it is not on the airplane structure.

S 103-003

- (2) Do these steps to clean the No. 2 and 3 windows (acrylic):

EFFECTIVITY

ALL

12-16-02

02

Page 302
Dec 22/08

WARNING: MAKE SURE THE WINDOW HEAT SWITCHES ARE IN THE OFF POSITION, AND THAT THE WINDOW HEAT INOP LIGHTS ARE ON. FAILURE TO OBEY CAN RESULT IN AN ELECTRICAL SHOCK WHEN YOU TOUCH THE WINDOWS.

- (a) Put the LEFT FWD, LEFT SIDE, RIGHT FWD and RIGHT SIDE WINDOW HEAT switches on the pilot's overhead panel, P5 to the OFF position. Attach DO-NOT-OPERATE tags to the switches.
- (b) Make sure the HEAT INOP lights are on.
- (c) Use a chamois to apply a soap solution to the inner and outer surfaces of the windows.

CAUTION: IF YOU OPEN THE NO. 2 WINDOW TO WASH THE OUTSIDE OF THE WINDOW, BE CAREFUL NOT TO CAUSE DAMAGE TO THE BULB SEAL. DAMAGED SEALS CAN CAUSE AIR LEAKS DURING FLIGHT.

- (d) Clean the windows with the minimum necessary pressure.
- (e) Flush the window with clean water.

CAUTION: DO NOT RUB A DRY WINDOW PANE. SCRATCHES OR AN ELECTROSTATIC CHARGE CAN OCCUR IF YOU RUB A DRY WINDOW PANE. THE SCRATCHES WILL DECREASE THE VISUAL CAPACITY OF THE WINDOW PANE. AN ELECTROSTATIC CHARGE CAN COLLECT DUST PARTICLES ON THE WINDOW PANE.

- (f) Dry the window with a clean, moist chamois.

NOTE: You can apply wax on the inner and outer surfaces of No. 2 and 3 windows.

TASK 12-16-02-603-004

3. Apply the Wax

A. General

- (1) You can only apply wax on the No. 2 and 3 windows.

B. Consumable Materials

- (1) B00709 Static Stop Cleaner Wax
- (2) B00707 DuPont No. 7 Auto Polish and Cleaner
- (3) B00708 Johnson's Pride
- (4) B00099 Wax - Simoniz Paste
- (5) G01990 Cotton Flannel

C. Access

- (1) Location Zones
 - 211/212 Control Cabin - Section 41 (Left/Right)

D. Procedure - Apply the Wax

EFFECTIVITY

ALL

12-16-02

02

Page 303
Aug 22/05

S 863-005

WARNING: MAKE SURE THE WINDOW HEAT SWITCHES ARE IN THE OFF POSITION, AND THAT THE WINDOW HEAT INOP LIGHTS ARE ON. FAILURE TO OBEY CAN RESULT IN AN ELECTRICAL SHOCK WHEN YOU TOUCH THE WINDOWS.

(1) Put the LEFT FWD, LEFT SIDE, RIGHT FWD and RIGHT SIDE WINDOW HEAT switches on the pilot's overhead panel, P5, to the OFF position. Attach DO-NOT-OPERATE tags to the switches.

S 713-009

(2) Make sure the WINDOW HEAT INOP lights are on.

S 103-006

(3) Refer to the above procedure to clean the windows.

S 603-007

(4) Use a piece of cotton flannel to apply a light layer of wax on the inner and outer surfaces of the windows.

S 603-008

(5) Polish the windows with a cotton flannel. Use the minimum necessary pressure.

EFFECTIVITY

ALL

12-16-02

02

Page 304
Aug 22/01

PASSENGER WINDOWS - SERVICING

1. General

- A. This procedure contains these tasks:
(1) Passenger Window Cleaning,
(2) Antistatic Agent Application (Optional).

TASK 12-16-03-103-001

2. Passenger Window Cleaning

A. General

- (1) The inner pane is a part of the decorative panel. It is not necessary to remove the decorative panel to clean the inner pane.

B. Consumable Materials

- (1) G01989 Castile Soap - Commercially Available
(2) B00106 Chamois - Spec KK-C-300 Oil Tan

C. References

- (1) AMM 56-21-01/401, Passenger Windows

D. Access

- (1) Location Zones
200 Upper Half of Fuselage

E. Procedure - Clean the Passenger Windows

S 103-002

- (1) To clean the surfaces of the inner, middle and outer window panes, do these steps:
(a) Remove the window and disassemble the middle and outer panes from the seal (AMM 56-21-01/401).
(b) Apply the soap solution to the window panes with a chamois.
(c) Clean the window panes with the minimum necessary pressure.
(d) Flush the window panes with clean water.

CAUTION: DO NOT RUB A DRY WINDOW PANE. SCRATCHES OR AN ELECTROSTATIC CHARGE CAN OCCUR IF YOU RUB A DRY WINDOW PANE. THE SCRATCHES WILL DECREASE THE VISUAL CAPACITY OF THE WINDOW PANE. AN ELECTROSTATIC CHARGE CAN COLLECT DUST PARTICLES ON THE WINDOW PANE.

CAUTION: DO NOT MOVE THE HEAT SENSOR WIRES WHEN YOU CLEAN THE INNER SURFACE. YOU CAN CAUSE THE CONNECTORS TO BECOME LOOSE. IF THE CONNECTORS BECOME LOOSE, IT CAN CAUSE THEM TO BECOME TOO HOT.

- (e) Dry the window panes with a clean, damp chamois.
(f) Refer to the procedure below to apply an antistatic agent (optional).
(g) Examine the seal for damage or wear before you assemble the middle and outer window panes.
1) Replace the seal if necessary.
(h) Install the windows (AMM 56-21-01/401).

EFFECTIVITY

ALL

12-16-03

02

Page 301
Apr 22/08

S 103-003

- (2) To clean the outer surface of the outer window pane and the inner surface of the inner window pane only, do these steps:
 - (a) Apply a soap solution to the outer surface of the outer window pane and the inner surface of inner window pane with a chamois.
 - (b) Clean the window panes with the minimum necessary pressure.
 - (c) Flush the window panes with clean water

CAUTION: DO NOT RUB A DRY WINDOW PANE. SCRATCHES OR AN ELECTROSTATIC CHARGE CAN OCCUR IF YOU RUB A DRY WINDOW PANE. THE SCRATCHES WILL DECREASE THE VISUAL CAPACITY OF THE WINDOW PANE. AN ELECTROSTATIC CHARGE CAN COLLECT DUST PARTICLES ON THE WINDOW PANE.

- (d) Dry the window panes with a clean, damp chamois.

TASK 12-16-03-603-004

3. Antistatic Agent Application (Optional)

A. Consumable Materials

- (1) G00073 Antistatic Agent - (Windows) Activol 139 OM
- (2) G00027 Cheesecloth - BMS 15-5 Shurwipe, boil and drain three times

B. References

- (1) AMM 56-21-01/401, Passenger Windows

C. Access

- (1) Location Zones
200 Upper Half of Fuselage

D. Procedure - Apply the Antistatic Agent

S 023-005

- (1) Remove the window, and disassemble the middle and outer panes from the seal (AMM 56-21-01/401).

S 103-006

- (2) Refer to the above procedure to clean the windows.

S 603-007

- (3) Mix 10 parts (by weight) antistatic agent with 120 parts (by weight) water.

EFFECTIVITY

ALL

12-16-03

02

Page 302
Aug 10/96

- S 843-019
- (4) Soak the boiled cheesecloth in the antistatic solution.
- S 623-021
- (5) Rub the windows with the cheesecloth that is soaked with the antistatic solution.
- (a) Let the window dry.
- S 623-020
- (6) Rub the windows with a clean and dry cheesecloth that was boiled.
- (a) Rub the window in straight line movements until the window is glossy.
- NOTE: Water will remove the antistatic solution. Keep the window dry.
- S 213-023
- (7) Examine the seal for damage or wear before you assemble the middle and outer window panes. Replace the seal if it is necessary.
- S 423-024
- (8) Install the windows (AMM 56-21-01/401).

EFFECTIVITY

ALL

12-16-03

01

Page 303
Aug 22/04

WASTE TANK – SERVICING

1. General

- A. The two waste tanks are drained at the same time through the waste tank drain connection. There are two waste tank flush connections, one for each waste tank.
- B. If the waste tank is scheduled to be cleaned and examined, do this procedure. You should clean or examine the waste tank after the waste tank is drained and flushed, but before the chemical precharge is added (AMM 38-32-11/401).
- C. During servicing, the waste tanks are drained and then each waste tank is flushed. After the waste tanks are flushed, a chemical precharge is added. The precharge can be added through the waste tank flush connections at the service panel (Procedure I) or it can be flushed down the toilets (Procedure II). Procedure I completes the waste tank servicing at the service panel. With Procedure II you must do work at the service panel and in the lavatories but it saves approximately 100 pounds (45 kg) in weight.

NOTE: It is necessary to flush the waste tank to make sure the waste tank and its internal components are clean. If the flush of the waste tank is satisfactory, the waste tank will have its maximum storage capacity available.

TASK 12-17-01-613-009

2. Waste Tank Servicing

- A. Equipment
 - (1) Toilet Service Cart
- B. Consumable Materials
 - (1) B00490 Chemical Precharge (Deodorant)
 - (a) Chemical Precharge:
 - 1) Sani-Pak SP77000 Series and SP97000 Series
Celeste Industries
Easton, MD

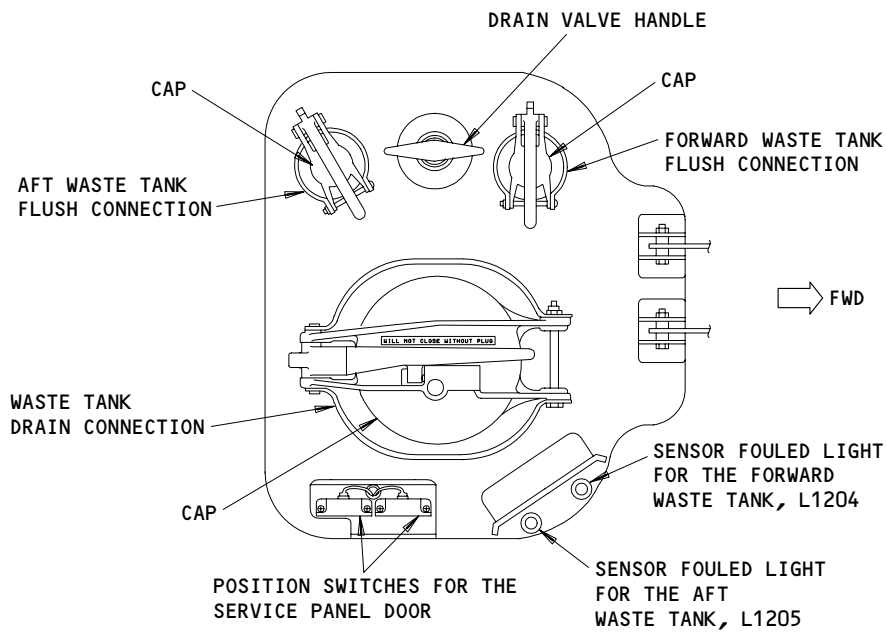
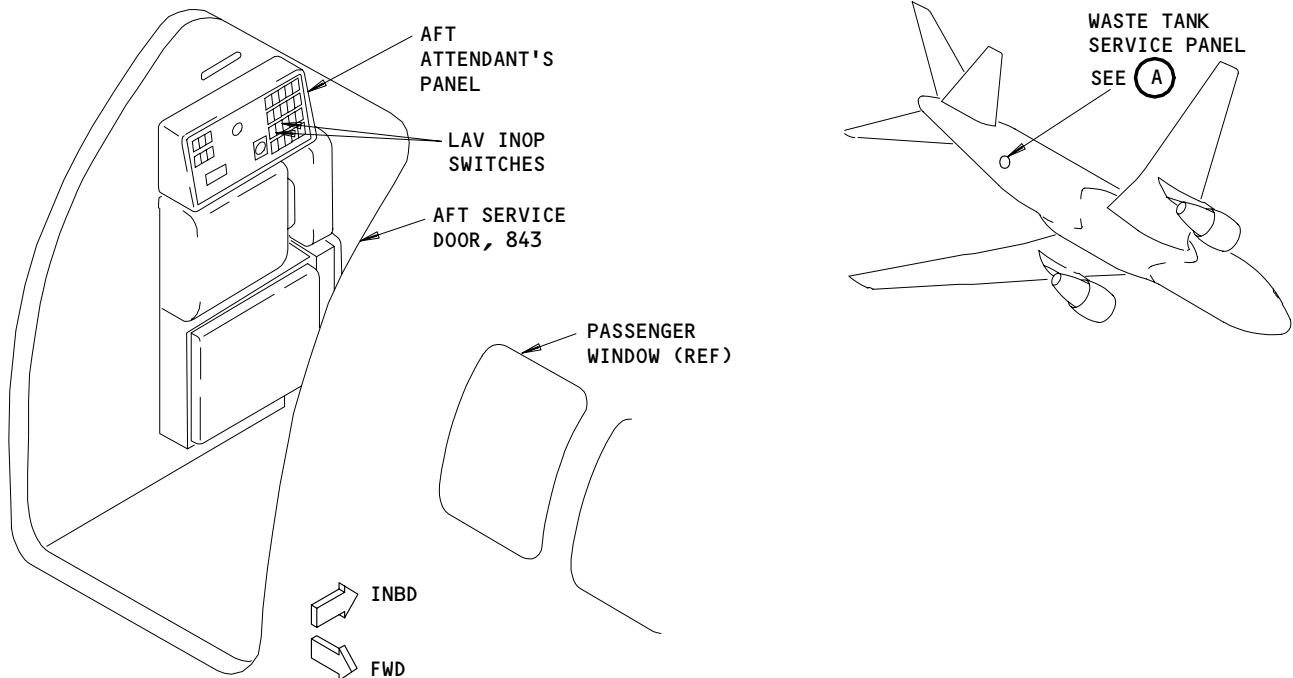
EFFECTIVITY

ALL

12-17-01

04

Page 301
Dec 22/07



WASTE TANK SERVICE PANEL

(A)

Waste Tank Servicing
Figure 301

EFFECTIVITY	
	ALL

12-17-01

- 2) Honey Bee 24
McGean-Rohco Inc.
Cleveland, Ohio
- 3) Honey Bee 33
McGean-Rohco Inc.
Cleveland, Ohio
- 4) Use for PROCEDURE II only:
Sani-Pak SP-77008
Celeste Industries
Easton, MD

C. References

- (1) AMM 24-22-00/201, Manual Control
- (2) AMM 38-10-00/201, Potable water
- (3) AMM 38-32-11/201, Waste Tanks
- (4) AMM 52-49-00/001, External Service Door

D. Access

- (1) Location Zone
163 Area Below Bulk Cargo Compartment (Left)
- (2) Access Panel
163AL Waste-Tank Service Panel

E. Procedure (Fig. 301)

- S 863-008
- (1) Supply electrical power (AMM 24-22-00/201).
- S 683-002
- (2) Do these steps to drain the Waste Tanks:
 - (a) Open the door for the waste tank service panel, 163AL (AMM 52-49-00/001).
 - (b) Open the cap on the waste tank drain connection.

EFFECTIVITY

ALL

12-17-01

02

Page 303
Dec 22/07

- (c) AIRPLANES WITH PLUG-TYPE DRAIN VALVE CONNECTION;
If the drain hose of the toilet service cart does not have a Y-fitting do the steps that follow:
- 1) Remove the drain plug from the waste tank drain connection with a drain plug wrench.
 - 2) Connect the drain hose of the toilet service cart to the waste tank drain connection.
- (d) AIRPLANES WITH PLUG-TYPE DRAIN VALVE CONNECTION;
If the drain hose of the toilet service cart has a Y-fitting do the steps that follow:
- 1) Connect the Y-fitting (with the waste drain hose of the toilet service cart) to the waste tank drain connection.
 - 2) Push the T-handle on the Y-fitting in to engage the drain plug that is in the waste tank drain connection.
 - 3) Rotate the T-handle counterclockwise until the drain plug is released from the waste tank drain connection.
 - 4) Pull the T-handle out until it stops.
- (e) AIRPLANES WITH OPEN AND CLOSE LEVERS ON DRAIN CONNECTION;
If the drain hose for the toilet service cart has a Y-fitting, pull the T-handle fully out.

NOTE: This gives clearance for the flapper valve in the waste tank drain connection.

- 1) Connect the waste drain hose of the toilet service cart to the waste tank drain connection.
- 2) Open the flapper valve in the waste tank drain connection.

NOTE: To do this turn the OPEN lever 1/4 turn in the direction of the OPEN arrow.

- (f) AIRPLANES WITH PUSH-TO-OPEN LEVER DRAIN CONNECTION;
Do these tasks:
- 1) Connect the waste drain hose of the toilet service cart to the waste tank drain connection.
 - 2) Push the PUSH-TO-OPEN lever on the drain valve connection.

EFFECTIVITY

ALL

12-17-01

02

Page 304
Aug 22/99

- (g) Pull the drain ball valve handle down to drain the waste tanks.

NOTE: Do not turn the ball valve handle.

NOTE: While the tanks drain, feel the waste drain hose to make sure the liquid flows. The waste drain hose pressure should not exceed 8.8 PSID (60.7 kPa).

CAUTION: USE TOOLS CAREFULLY BECAUSE THE WASTE TANKS ARE A HONEYCOMB WITH A GRAPHITE COMPOSITE SKIN, WHICH IS EASILY DAMAGED. IF YOU HIT THE TANK WITH LOW ENERGY, THIS CAN CAUSE DAMAGE THAT YOU CANNOT SEE BEFORE A TANK FAILS. DO NOT HIT THE WASTE TANK, BECAUSE DAMAGE CAN OCCUR.

- 1) If the ball valve will not open without too much force, do the steps that follow:

NOTE: The seals of the ball valve can be swollen. If you force the ball valve open, you must replace the ball valve.

- a) Open the bulk cargo door, 811 (AMM 52-36-00/001).
- b) Remove the aft bulkhead lining of the bulk cargo compartment (AMM 25-52-01/401).
- c) Use a suitable tool to force the ball valve to the open position.
- d) After you do the task to flush the waste tanks, replace the ball valve (AMM 38-32-03/401).

S 173-003

- (3) Flush the Waste Tanks as follows:

- (a) Open the caps on the forward and the aft waste tank flush connections.

CAUTION: THE TOILET SERVICE CART MUST SUPPLY SUFFICIENT PRESSURE, 30-50 PSIG (205-345 KPA) (WITH A MAXIMUM OF 80 PSIG (550 KPA)), AND A FLOW OF 10 GPM (40 LITERS/MIN) MINIMUM. IF THE PRESSURE OR FLOW IS TOO SMALL THE WASTE TANKS WILL NOT GET CLEAN. THIS WILL CAUSE THE WASTE TANK VOLUME TO BE LESS THAN THE TANK VOLUME OF A CLEAN TANK.

- (b) Connect the flush line, of the toilet service cart, to the forward waste tank flush connection.
- (c) Make sure the drain ball valve for the waste tanks are open (pull the handle down).

EFFECTIVITY

ALL

12-17-01

04

Page 305
Aug 22/06

CAUTION: MAKE SURE YOU FLUSH THE WASTE TANKS FULLY. IF YOU DO NOT FLUSH THE WASTE TANKS FULLY, THE WASTE TANK VOLUME CAN BE LESS THAN THE TANK VOLUME OF A CLEAN TANK.

- (d) Flush the forward waste tank with a minimum of 10 gallons (40 liters) (50 gal or 200 liter maximum) of flushing fluid. Make sure the flushing fluid drains from the waste tank.

NOTE: To make sure the flushing fluid drains, listen to or feel for the flow of fluid in the drain hose.

- (e) Disconnect the flush line from the forward waste tank flush connection.

CAUTION: THE TOILET SERVICE CART MUST SUPPLY SUFFICIENT PRESSURE 30-50 PSIG (205-345 KPA) (WITH A MAXIMUM OF 80 PSIG (550 KPA)), AND A FLOW OF 10 GPM (40 LITERS/MIN) MINIMUM. IF THE PRESSURE OR FLOW IS TOO SMALL THE WASTE TANKS WILL NOT GET CLEAN. THIS WILL CAUSE THE WASTE TANK VOLUME TO BE LESS THAN THE TANK VOLUME OF A CLEAN TANK.

- (f) Connect the flush line to the aft waste tank flush connection.
- (g) Make sure the drain ball valves for the waste tanks are open (pull the valve handle down).
- (h) Flush the aft waste tank with a minimum of 10 gal (40 liters) (50 gal or 200 liters maximum) of flushing fluid. Make sure the flushing fluid drains from the waste tank.

NOTE: To make sure the flushing fluid drains, listen to or feel for the flow of fluid in the drain hose.

- (i) When the waste tanks have drained, push the drain valve handle up to close the drain ball valves. Do not turn the drain valve handle.
- (j) Disconnect the waste drain hose from the waste tank drain connection.
- (k) Make sure the drain valves are closed (push the drain valve handle up).

S 113-004

- (4) Add the Chemical Precharge (Deodorant) to the Waste-Tanks.
 - (a) Procedure I (Alternative to Procedure II) - Add the chemical precharge to the waste-tanks through the waste-tank service panel.

EFFECTIVITY

ALL

12-17-01

03

Page 306
Dec 22/04

WARNING: FOLLOW THE MANUFACTURER'S INSTRUCTIONS WHEN YOU USE THE CHEMICAL PRECHARGE. THE CHEMICAL PRECHARGE IS CORROSIVE AND/OR POISONOUS AND CAN CAUSE AN INJURY TO YOU OR DAMAGE TO THE AIRPLANE.

CAUTION: DO NOT ADD THE CHEMICAL PRECHARGE TO THE WASTE-TANKS IF THE AIRPLANE CAN POSSIBLY FREEZE. IF IT IS ADDED, THE CHEMICAL PRECHARGE CAN FREEZE AND CAUSE DAMAGE TO THE WASTE SYSTEM.

- 1) If the airplane will not freeze, put six gallons (22 liters) of the chemical precharge into the aft waste tank.

NOTE: Some airplanes will automatically stop the flow of precharge at about six gallons.

Put the chemical precharge in through the aft waste tank flush connection.

- 2) Disconnect the flush line from the aft waste-tank flush connection.

NOTE: Make sure the flush line is fully drained.

- 3) Connect the flush line to the forward waste-tank flush connection.

- 4) If the airplane will not freeze, put 6 gallons (22 liters) of the chemical precharge into the forward waste tank.

NOTE: Some airplanes will automatically stop the flow of precharge at about six gallons.

Put the chemical precharge in through the forward waste tank flush connection.

- 5) Disconnect the flush line from the forward waste-tank flush connection.

NOTE: Make sure the flush line is fully drained.

- 6) Close the caps on the waste-tank flush connections.
- 7) Make sure there is no leakage from the waste drain connection.
- 8) Close the cap for the waste drain connection.
- 9) Clean and dry all the components on the service panel, this includes the door.

EFFECTIVITY

ALL

12-17-01

02

Page 307
Dec 22/02

- 10) Close the door for the waste tank service panel, 163AL (AMM 52-49-00/001).
- 11) Make sure all the toilets operate correctly.
- (b) Procedure II (Alternative to Procedure I) – Add the chemical precharge to the waste-tanks by flushing it down the toilets nearest the waste-tanks.
 - 1) Disconnect the flush line from the aft waste-tank flush connection.
 - 2) Close the caps on the waste tank flush connections.
 - 3) Make sure there is no leakage from the waste drain connection.
 - 4) Close the cap for the waste drain connection.
 - 5) Clean and dry all the components on the service panel, this includes the door.
 - 6) Close the door for the waste tank service panel, 163AL (AMM 52-49-00/001).
 - 7) Make sure the potable water tanks have water and the potable water system is pressurized (AMM 38-10-00/201).
 - 8) Do these steps to find the two lavatories that are nearest to the waste-tanks:
 - a) Find the two LAV INOP switch-lights on the aft flight attendant's panel.
 - b) The lavatory shown at the bottom of each switch-light is the lavatory nearest to the waste-tank.

WARNING: FOLLOW THE MANUFACTURER'S INSTRUCTIONS WHEN YOU USE THE CHEMICAL PRECHARGE. THE CHEMICAL PRECHARGE IS CORROSIVE AND/OR POISONOUS AND CAN CAUSE AN INJURY TO YOU OR DAMAGE TO THE AIRPLANE.

CAUTION: DO NOT ADD THE CHEMICAL PRECHARGE TO THE WASTE-TANKS IF THE AIRPLANE CAN POSSIBLY FREEZE. IF IT IS ADDED, THE CHEMICAL PRECHARGE CAN FREEZE AND CAUSE DAMAGE TO THE WASTE SYSTEM.

- 9) Put sufficient chemical precharge for a 60-gallon tank down each of the two toilets selected in the step above.

NOTE: Follow the manufacturers instructions when you use the chemical precharge.

- 10) Operate the two toilets.

S 863-010

- (5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 12-17-01-113-005

3. Clean the Waste-Tank Service Panel

A. General

- (1) Regularly clean the waste-tank service panel.

EFFECTIVITY

ALL

12-17-01

02

Page 308
Aug 22/06

B. Consumable Materials

- (1) B00261 Emulsion Cleaner
- (2) G00217 Sponge
- (3) G00034 Cheesecloth

C. Access

- (1) Location Zone
 - 163 Area Below Bulk Cargo Compartment (Left)
- (2) Access Panel
 - 163AL Waste-Tank Service Panel

D. Procedure

- S 113-006
 - (1) Clean the waste-tank service panel with water, emulsion cleaner, and the sponge.
- S 163-007
 - (2) Dry the waste-tank service panel with the clean cheesecloth.

EFFECTIVITY

ALL

12-17-01

01

Page 309
Dec 22/02

AIRPLANE LUBRICATION - SERVICING

1. General

A. This procedure contains these tasks:

- (1) General Instruction for Lubrication
- (2) Changing of Approved Grease Brands or Specification Types

TASK 12-21-00-913-001

2. General Instructions for Lubrication

A. General

(1) Description

- (a) This section of the AMM gives the usual on-airplane lubrication procedures. Specific data about where to lubricate is given in the subsequent subjects of this section.
- (b) There are other lubrication instructions in other ATA sections of the AMM about equipment removal and replacement.

(2) General-Purpose Aviation Grease

(a) Boeing chooses the grease to use based on the specific application. Greases that meet the following specifications are considered general-purpose aviation grease for applications that operate in the -100 to 250°F (-73 to 121°C) range:

- 1) BMS 3-33
- 2) MIL-PRF-23827
- 3) MIL-G-21164 (NATO G-353)

(b) BMS 3-33 is the preferred general-purpose aviation grease recommended by Boeing for applications exposed to temperatures of less than 250°F. It is recommended because it shows better wear, corrosion protection, and low temperature torque properties.

- 1) BMS 3-33 is satisfactory to be used:
 - a) When MIL-PRF-23827 was specified.
 - b) When MIL-G-21164 was specified AND MIL-PRF-23827 is given as an option.
 - c) When BMS 3-24 is specified for use in which the maximum service temperature is not more than 250°F.
- 2) BMS 3-33 cannot be used where MIL-G-21164 or Royco 11MS are the only greases specified because BMS 3-33 was found not to be satisfactory in heavily loaded sliding applications.
- 3) Greases that have been used before and approved by Boeing for the specific assembly are listed as flagnotes on the lubrication instructions for the specific assembly. If there is an application where only one grease must be used, it will be listed with the word "Only" after it.

EFFECTIVITY

ALL

12-21-00

01

Page 301
Apr 22/05

- (3) Special Performance Greases
 - (a) Special performance greases include:
 - 1) Royco 11MS
 - 2) MIL-PRF-81322 (NATO G-354)
 - 3) BMS 3-24
 - (b) In some applications, a special purpose grease is necessary. Where only one grease is recommended for a specific application, it will be listed with the word "Only" after it.
 - (4) Other Lubricants
 - (a) BMS 3-32, Type II Landing Gear Shock Strut Fluid, Anti-Wear
 - (b) MIL-H-5606, Hydraulic Fluid, Petroleum base, Aircraft (NATO H-515)
 - (c) MIL-PRF-7870, Lubricating Oil, General Purpose, Low Temperature (NATO O-142)
 - (5) Lubrication Symbols
 - (a) Lubrication blocks are used to show the part or unit to be lubricated
 - (b) Examples of Lubrication blocks used in the manual are shown in Lubrication Symbols (Fig. 301). If necessary, more data is given near the lubrication block to help you lubricate the airplane correctly. Each block shows this data:
 - 1) The lubrication method
 - 2) The type of lubricant
 - 3) The access panel number is given above or below the lubrication block for points if it is not easy to find the area you must lubricate.
 - (c) More data on commonly used grease is available in Boeing Service Letter 767-SL-20-027, Summary of Most Commonly Used Greases on Boeing Airplanes.
- B. Reference
- (1) Lubrication Fitting Replacement (AMM 20-10-29/401).
- C. Lubrication Application Procedures and Cautions

S 913-002

- (1) Do these steps to prevent lubricant contamination:
 - (a) Put lubricant identification labels on all containers, guns, and dispensers.
 - (b) Keep lubricants in containers that have tight covers.
 - 1) Make sure that the container material will not absorb contamination.
 - (c) Do not let contamination get in the lubricant.
 - 1) Keep out dust and other contamination when the container is open.
 - 2) Keep the grease guns, brushes, and oil cans clean.

EFFECTIVITY

ALL

12-21-00

01

Page 302
Aug 22/03

S 913-003

(2) Do these steps for correct lubrication:

CAUTION: DO NOT LET DIRT, FILINGS, AND OTHER UNWANTED MATERIAL GET IN THE LUBRICANT DURING AND AFTER LUBRICATION.

(a) Remove dirt from the grease fittings before you attach the grease gun.

WARNING: DO NOT SET THE GUN TO A PRESSURE THAT IS MORE THAN 2500 PSI (17237 KPa). TOO MUCH PRESSURE WILL CAUSE THE FITTING TO COME OUT AT A HIGH SPEED. THIS CAN CAUSE INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT.

(b) Make sure that the pressure that you set is less than 2500 psi (17237 KPa).

(c) Set the pressure at 100 to 200 psi (689 - 1379 KPa) unless otherwise specified.

NOTE: This is usually sufficient to push out the used grease.

(d) Find all of the lubrication points that are identified in the specific maintenance task.

1) Use the specified lubricant.

2) Use an Alemite Midget flush adapter (No. 314150) for flush-type grease fittings.

3) Apply all lubricants slowly and smoothly.

4) Dispense grease into the grease fitting until the used grease is visually removed and only new grease comes out.

NOTE: This removes contamination along with the used grease.

(e) After lubrication, remove the unwanted grease or lubricating fluid that is around the part or on other parts with a wiper to prevent contamination and damage to other surfaces.

EFFECTIVITY

ALL

12-21-00

01

Page 303
Apr 22/03

CAUTION: LUBRICATE ONLY THE APPLICATIONS THAT HAVE LUBRICATION FITTINGS. DO NOT LUBRICATE TEFLON BEARINGS AND BUSHINGS BECAUSE LUBRICANTS MAY CAUSE DAMAGE TO THE TEFLON AND DECREASE THE LIFE OF THE BEARING.

(f) Do not lubricate Teflon bearings and bushings.

NOTE: It is not necessary to lubricate these bearings.

- (g) If a grease fitting comes out, do these steps:
- 1) Look for blockage in the fitting or part.
 - 2) If it is necessary, disassemble the part to remove the blockage.
 - 3) Install a new fitting (AMM 20-10-29/401).
- (h) Be careful when you lubricate sealed-ball, or sealed-roller bearings that have a grease fitting.
- 1) Do not push the seal out with the grease.
 - 2) Use a restrictor-type adapter to decrease the flow rate of the grease.
 - 3) Stop the operation if the shape of the seal starts to change, or if the grease comes out of the bearing.

TASK 12-21-00-913-004

3. Changing of Approved Grease Brands or Specification Types

A. General

- (1) Boeing and grease manufacturers agree it is a best practice to limit intermixing of different types or brand-names of grease.
- (2) If you mix two different types or brand-names of greases, the performance and properties of the mixture may be degraded when compared with the performance and properties of the original, unmixed greases.
- (3) Use a different grease (alternative, optional, or brand-name) only after you remove the used grease as discussed below either by pumping or disassembly.
- (4) Purging
 - (a) Purging is the industry-recognized practice of replacing one grease with another. It is also the recommended procedure to be following in all lubrication tasks, even when not switching from one grease brand or type to another. It is used to ensure that as much of the used grease as possible or practical is removed from the assembly and is replaced by new grease.
 - 1) Purge the grease only when it is not possible or practical to disassemble to remove the used grease.
 - 2) The new grease can be the same type or a different type of grease if permitted for the application.

EFFECTIVITY

ALL

12-21-00

01

Page 304
Apr 22/03

- 3) Purging removes the contamination (wear debris, etc.) along with the used grease.
- (b) Purging applies both to greasing with a new brand of grease and to usual greasing with the same grease.
- (c) When an assembly is purged with a new brand of grease, a quantity of the previously used grease can continue to be in the assembly. The subsequent purging from the second and third lubrication operations with the new grease will decrease the remaining concentration of the previously used grease.

B. Procedure

S 913-005

- (1) Make sure that the grease that you use is permitted by the specific AMM instructions and your local maintenance practices.

S 913-006

- (2) Where surfaces are exposed or disassembly is a practical part of the lubrication procedure (e.g., wheel bearings), do these steps to replace the used grease:
 - (a) Remove all of the used grease from the bearing surfaces, and internal spaces of the mechanism with wipes.
 - (b) Lubricate the bearing surfaces with the new grease.

S 913-007

- (3) Where it is not possible or practical to disassemble the mechanism, do these steps to purge the used grease:
 - (a) Slowly put the new grease into each grease fitting.
 - (b) Continue to add grease until all used grease is visually removed and only the new grease comes out.

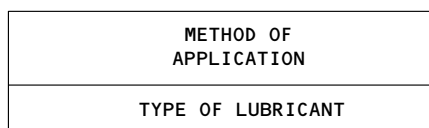
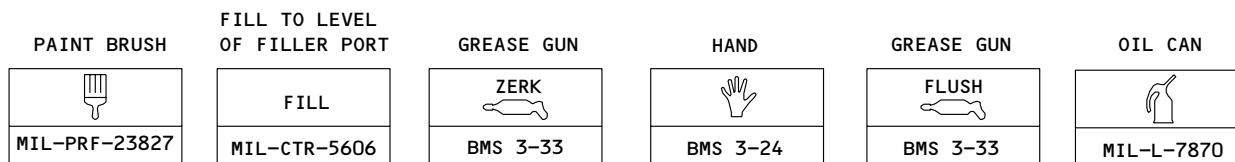
EFFECTIVITY

ALL


12-21-00

01

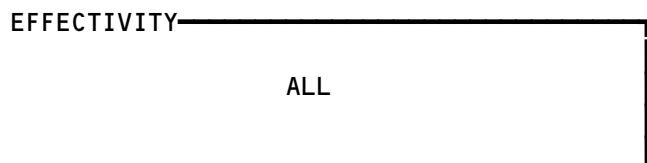
Page 305
Apr 22/03



(Sample Symbol)

 FLAG NOTES ARE USED TO PROVIDE
ALTERNATE LUBRICANT AND
ADDITIONAL INSTRUCTION.

Lubrication Symbols
Figure 301



12-21-00

01

Page 306
Apr 22/03

ELEVATOR CONTROL SYSTEM – SERVICING

1. General

A. This procedure contains steps to lubricate the elevator control system.

TASK 12-21-04-643-001

2. Lubricate the Elevator Control System

A. Consumable Materials

- (1) D00633 Grease – BMS 3-33 (Recommended)
- D00013 Grease – MIL-PRF-23827 (Alternative)

B. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 27-31-05/201, Elevator Power Control Actuator Lock Tool

C. Access

(1) Location Zones

- 330 Left Horizontal Stabilizer and Elevator
- 340 Right Horizontal Stabilizer and Elevator

(2) Access Panels

- FOR AIRPLANES WITH ONE-PIECE HORIZONTAL STABILIZER TE SEAL.
- 335CB, 335DB, 335EB Elevator Control Mechanism, Position Transmitter (Left)
- 335GB, 335HB Elevator Control Mechanism (Left)
- 335JB, 335KB, 335LB Elevator Spar Hinge Fitting and T.E. Horizontal (Left)
- 345CB, 345DB, 345EB Elevator Control Mechanism, Position Transmitter (Right)
- 345GB, 345HB Elevator Control Mechanism (Right)
- 345JB, 345KB, 345LB Elevator Spar Hinge Fitting and T.E. Horizontal (Right)
- 335AFB Elevator Hinges (Left)
- 345AFB Elevator Hinges (Right)

D. Prepare to Lubricate the Elevator Control System

S 863-004

- (1) Put the LEFT and CENTER STAB TRIM SHUTOFF TAIL valve switches on the control stand to CUTOUT.

S 863-002

- (2) Attach DO-NOT-OPERATE tags to the LEFT and CENTER TRIM SHUTOFF valve switches.

S 863-005

- (3) Put the RIGHT, LEFT, and CENTER FLT CONT SHUTOFF TAIL valve switches on the sidewall panel, P61, to OFF.

EFFECTIVITY

ALL

12-21-04

04

Page 301
Dec 22/08

S 863-003

- (4) Attach DO-NOT-OPERATE tags on the RIGHT, LEFT and CENTER FLT CONT SHUTOFF TAIL valve switches.

S 863-006

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;
11A36, ALT STAB TRIM
 - (b) 11C12, STAB TRIM SHUTOFF L
 - (c) 11C13, STAB TRIM SHUTOFF CENTER
 - (d) 11H17, FLT CONT SHUTOFF TAIL L
 - (e) 11H18, FLT CONT SHUTOFF TAIL CENTER
 - (f) 11H27, FLT CONT SHUTOFF TAIL R

S 423-015

- (6) Install elevator power control actuator lock (AMM 27-31-05/201).

S 013-007

- (7) Remove the access panels that follow (AMM 06-42-00/201):
- (a) FOR AIRPLANES WITH ONE-PIECE HORIZONTAL STABILIZER TRAILING EDGE SEAL:
335CB, 335DB, 335EB, 335GB, 335HB, 335JB, 335KB, 335LB, and 335AFB
 - (b) 345EB, 345GB, 345HB, and 345AFB

E. Lubricate the Elevator Control System

S 643-008

- (1) Lubricate the elevator control system (Fig. 301).
- F. Put the Airplane Back to Its Usual Condition.

S 863-014

- (1) Remove elevator power control actuator lock (AMM 27-31-05/201).

EFFECTIVITY

ALL

12-21-04

03

Page 302
Dec 22/08

- S 863-016
- (2) Install the access panels that you removed.
- S 863-009
- (3) Remove DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) AIRPLANES WITH ALTERNATE STAB TRIM SWITCHES ON THE CONTROL STAND;
11A36, ALT STAB TRIM
 - (b) 11C12, STAB TRIM SHUTOFF L
 - (c) 11C13, STAB TRIM SHUTOFF CENTER
 - (d) 11H17, FLT CONT SHUTOFF TAIL L
 - (e) 11H18, FLT CONT SHUTOFF TAIL CENTER
 - (f) 11H27, FLT CONT SHUTOFF TAIL R
- S 863-010
- (4) Remove the DO-NOT-OPERATE tags and put the LEFT, RIGHT and CENTER FLT CONT SHUTOFF TAIL valve switches on the P61 panel to ON.
- S 863-011
- (5) Remove the DO-NOT-OPERATE tags and put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel to NORM.

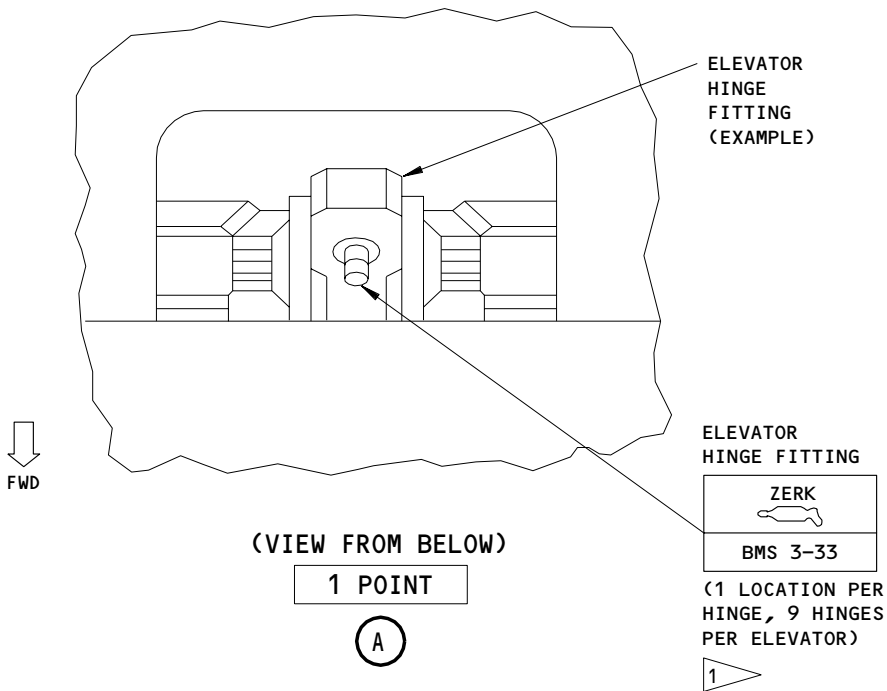
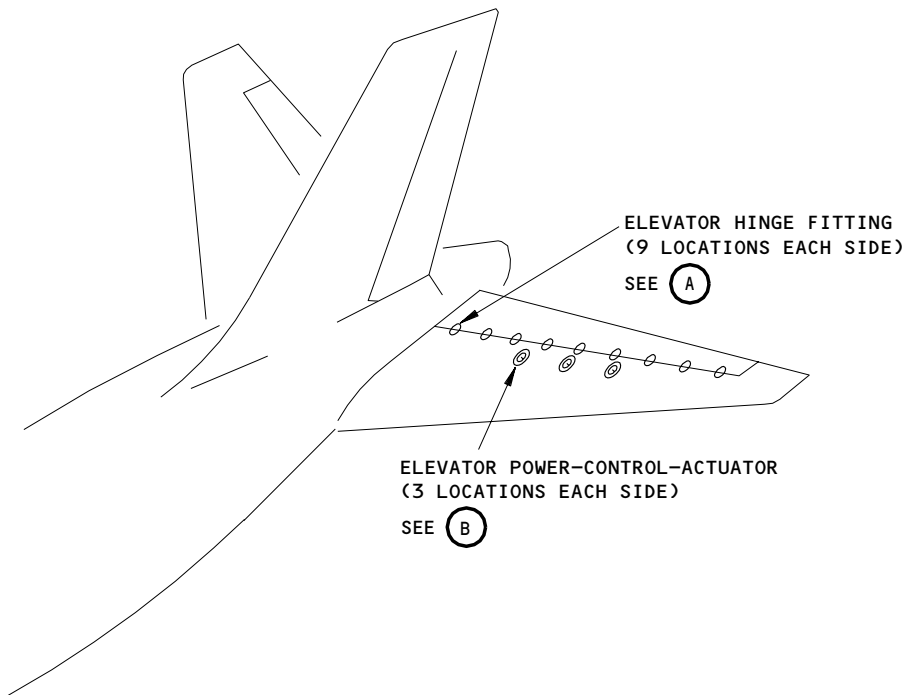
EFFECTIVITY

ALL

12-21-04

05

Page 303
Dec 22/08



1 BMS 3-33 RECOMMENDED, MIL-PRF-23827 ALTERNATIVE.

Elevator Hinge Fitting and Power Control Actuator Servicing
Figure 301 (Sheet 1)


EFFECTIVITY	ALL
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12-21-04

01

Page 304
Aug 22/02


ELEVATOR PCA

FLUSH 
BMS 3-33

(1 LOCATION PER ACTUATOR, 3 ACTUATORS PER ELEVATOR)

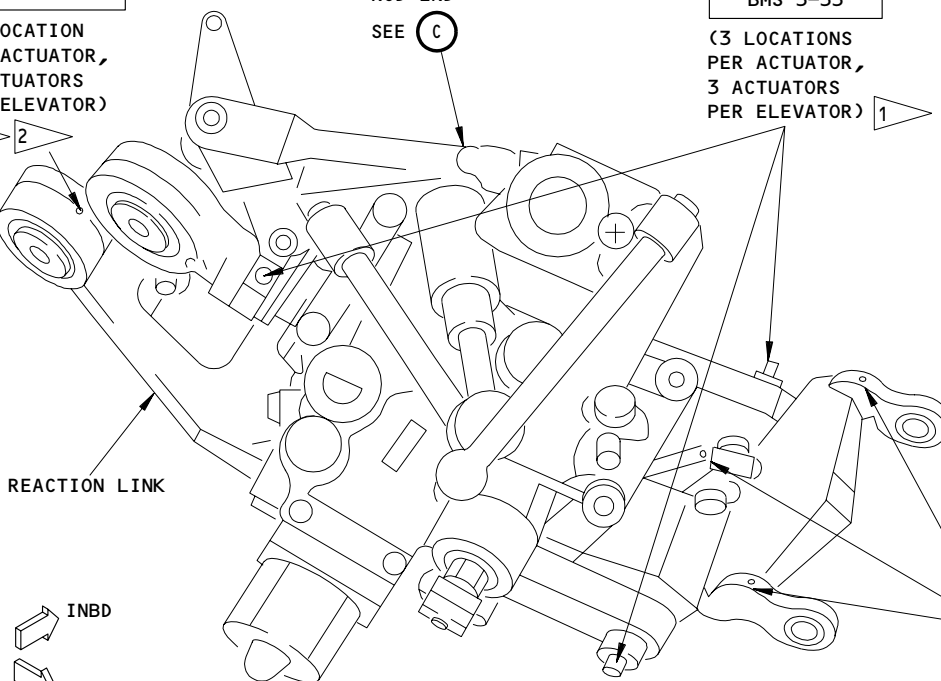
1 2

ELEVATOR PCA

ZERK 
BMS 3-33

(3 LOCATIONS PER ACTUATOR, 3 ACTUATORS PER ELEVATOR)


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REACTION LINK

INBD
FWD

ELEVATOR PCA

FLUSH 
BMS 3-33


(3 LOCATIONS PER ACTUATOR, 3 ACTUATORS PER ELEVATOR)

1

ELEVATOR POWER CONTROL UNIT

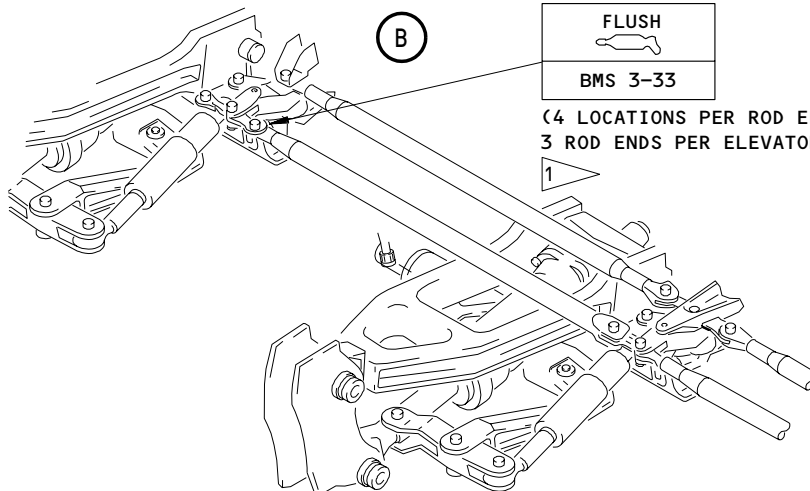
7 POINTS

INPUT ROD END

FLUSH 
BMS 3-33

(4 LOCATIONS PER ROD END, 3 ROD ENDS PER ELEVATOR)

1



ELEVATOR INPUT ROD END

4 POINTS

(C)

2 LUBRICATE ONLY ONE SIDE OF THE ROD END

Elevator Hinge Fitting and Power Control Actuator Servicing
Figure 301 (Sheet 2)

EFFECTIVITY

ALL

12-21-04

01

Page 305
Apr 22/09

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HORIZONTAL STABILIZER TRIM CONTROL SYSTEM – SERVICING

1. General

- A. This procedure contains two tasks. The first task lubricates the horizontal stabilizer trim control system. The second task lubricates the horizontal stabilizer trim control module (rod ends).

NOTE: The second task is only applicable to airplanes with stab trim levers on the control stand.

TASK 12-21-05-643-001

2. Lubricate the Horizontal Stabilizer Trim Control System

A. Consumable Materials

- (1) D00633 Grease – BMS 3-33 (Recommended)
- (2) D00013 Grease – MIL-PRF-23827 (Alternative)

B. References

- (1) AMM 06-42-00/201, Empennage Access Panels and Doors

C. Access

- (1) Location Zone
312 Area Aft of Pressure Bulkhead to BS 1725 (Right)

- (2) Access Panel
312AR Stabilizer Trim Ballscrew Actuator

D. Prepare to Lubricate the Horizontal-Stabilizer-Trim Control System

S 863-002

- (1) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to CUTOUT and attach DO-NOT-OPERATE tags.

S 863-003

- (2) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
 - (a) 11A36, ALT STAB TRIM (if installed)
 - (b) 11C12, STAB TRIM SHUTOFF L
 - (c) 11C13, STAB TRIM SHUTOFF CENTER

S 013-004

WARNING: STAY OFF THE SERVICE ACCESS DOOR, 312AR, AND THE ACCESS DOOR FOR THE CONTROLS BAY, 313AL. YOUR WEIGHT CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE. IF YOU FALL THROUGH THE DOOR, INJURY CAN OCCUR.

- (3) Open the access door, 312AR, for the horizontal stabilizer ballscrew actuator and control modules (AMM 06-42-00/201).

EFFECTIVITY

ALL

12-21-05

02

Page 301
Aug 22/02

E. Procedure - Stabilizer Ballscrew, Ballnut, and Gimbal Lubrication

S 213-032

- (1) Make sure that the trailing edge flaps and the leading edge slats are in the fully retracted position.

NOTE: With the flaps/slats in the full up position, the stabilizer actuator operates at half speed, for safety when lubricating the ballscrew.

S 213-031

- (2) Make sure that the flap lever is in the zero detent (FLAPS UP).

S 863-044

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

- (3) Pressurize the left and center hydraulic systems (AMM 29-11-00/201).

S 863-035

- (4) Put the STAB TRIM SHUTOFF switches on the P10 panel to CUTOUT.

S 863-036

- (5) Remove any old grease and dirt from the ballscrew threads by wiping them with a clean, dry, non-abrasive cloth.

S 863-037

- (6) Lubricate the upper and lower stabilizer gimbals with grease (Fig. 301).

S 863-056

- (7) Close these circuit breakers on the overhead panel, P11.
 - (a) 11A36, ALT STAB TRIM (if installed)
 - (b) 11C12, STAB TRIM SHUTOFF L
 - (c) 11C13, STAB TRIM SHUTOFF CENTER

S 863-038

- (8) Put the STAB TRIM SHUTOFF switches on the P10 panel to NORM.

S 863-039

- (9) Move the captain's stabilizer-trim control-wheel-switches up (airplane nose down).
 - (a) Make sure that the stabilizer moves to its full leading edge up position.

EFFECTIVITY

ALL

12-21-05

02

Page 302
Dec 22/08

- S 863-040
(10) Release the stabilizer-trim control-wheel-switches.
- S 863-041
(11) Put the STAB TRIM SHUTOFF switches on the P10 panel to CUTOUT.
- S 863-055
(12) Open these circuit breakers on the overhead panel, P11.
(a) 11A36, ALT STAB TRIM (if installed)
(b) 11C12, STAB TRIM SHUTOFF L
(c) 11C13, STAB TRIM SHUTOFF CENTER
- S 863-042
(13) Use grease on your hand to lubricate the bottom of the ballscrew between the ballnut and the endstop (Fig. 301).
- S 863-054
(14) Close these circuit breakers on the overhead panel, P11.
(a) 11A36, ALT STAB TRIM (if installed)
(b) 11C12, STAB TRIM SHUTOFF L
(c) 11C13, STAB TRIM SHUTOFF CENTER
- S 863-043
(15) Put the STAB TRIM SHUTOFF switches on the P10 panel to NORM.
- S 863-045
(16) Move the captain's stabilizer-trim control-wheel-switches down (airplane nose up).
(a) Make sure that the stabilizer moves to its full leading edge down position.
- S 863-046
(17) Release the stabilizer-trim control-wheel-switches.
- S 863-047
(18) Put the STAB TRIM SHUTOFF switches on the P10 panel to CUTOUT.
- S 863-053
(19) Open these circuit breakers on the overhead panel, P11.
(a) 11A36, ALT STAB TRIM (if installed)
(b) 11C12, STAB TRIM SHUTOFF L
(c) 11C13, STAB TRIM SHUTOFF CENTER
- S 863-048
(20) Use grease on your hand to lubricate the top of the ballscrew between the ballnut and the endstop (Fig. 301).
- S 863-052
(21) Close these circuit breakers on the overhead panel, P11.
(a) 11A36, ALT STAB TRIM (if installed)

EFFECTIVITY

ALL

12-21-05

02

Page 303
Aug 22/07

- (b) 11C12, STAB TRIM SHUTOFF L
- (c) 11C13, STAB TRIM SHUTOFF CENTER

S 863-049

- (22) Put the STAB TRIM SHUTOFF switches on the P10 panel to NORM.

S 863-051

- (23) Remove pressure from the center hydraulic system (AMM 29-11-00/201). This will allow the ballscrew to move at half speed.

S 863-057

- (24) Do the following to ensure that the ballscrew ballnut is properly lubricated:

WARNING: KEEP PERSONS AND EQUIPMENT AS FAR AWAY AS POSSIBLE FROM ALL MOVING PARTS WHILE MOVING THE STABILIZER UP OR DOWN. PERSONNEL APPLYING THE GREASE SHOULD BE IN DIRECT CONTACT WITH THE CONTROL WHEEL SWITCH OPERATOR. PERSONNEL APPLYING GREASE SHALL SECURE ALL LOOSE CLOTHING AND HAIR WHILE PERFORMING THIS OPERATION. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN MOVING THE STABILIZER UP OR DOWN.

- (a) Use the stabilizer trim switches on the control wheel to move the stabilizer from one endstop to the other endstop.
- (b) While the ballnut is moving from one endstop to the other, add grease to the ballscrew ballnut.

NOTE: Apply the grease continuously while the ballnut moves.

- (c) For Beaver ballnuts, add grease to the ballnut until fresh grease comes out from the top seal and bottom seal.
- (d) For Umbra ballnuts, add grease to the ballnut until fresh grease comes out from either the grease vent or the bottom seal (end opposite the zerk fitting).

EFFECTIVITY

ALL

12-21-05

02.1

Page 304
Aug 22/09

- (e) If no fresh grease comes out of either the grease vent or the top seal, replace the stabilizer trim actuator.
 - (f) Inspect the grease that comes out of the ballnut for signs of metallic debris, discolored water, rust, or other harmful particles. If any of these items are in the grease, replace the stabilizer trim ballscrew actuator.
 - (g) If it is necessary to replace the stabilizer trim ballscrew actuator, refer to (AMM 27-41-10/401).
 - (h) Remove unwanted grease from the ballnut.
- F. Put the Airplane Back to Its Usual Condition

S 863-008

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
 - (a) 11A36, ALT STAB TRIM (if installed)
 - (b) 11C12, STAB TRIM SHUTOFF L
 - (c) 11C13, STAB TRIM SHUTOFF CENTER

S 863-009

- (2) Remove DO-NOT-OPERATE tags and put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel to NORM.

S 413-010

- (3) Close the forward horizontal stabilizer compartment access door, 312AR (AMM 06-42-00/201).

TASK 12-21-05-643-021

3. AIRPLANES WITH STAB TRIM LEVERS ON THE CONTROL STAND;
Lubricate the Stab Trim Control Module (STCM)

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Recommended)
- (2) D00013 Grease - MIL-PRF-23827 (Alternative)

B. References

- (1) AMM 06-42-00/201, Empennage Access Panels and Doors

C. Access

- (1) Location Zone
 - 312 Area Aft of Pressure Bulkhead to BS 1725 (Right)
- (2) Access Panel
 - 312AR Stabilizer Trim Ballscrew Actuator

EFFECTIVITY

ALL

12-21-05

04

Page 305
Apr 22/09

D. Prepare to Lubricate the Stabilizer Trim Control Module

S 863-012

- (1) Put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the control stand panel, P10, to CUTOUT and attach DO-NOT-OPERATE tags.

S 863-013

- (2) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
 - (a) 11C12, STAB TRIM SHUTOFF L
 - (b) 11C13, STAB TRIM SHUTOFF CENTER

S 013-014

WARNING: DO NOT STAND OR LEAN ON THE SERVICE ACCESS DOOR (312AR) OR THE ACCESS DOOR FOR THE CONTROLS BAY (313AL). THE WEIGHT OF A PERSON CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE AND THE PERSON CAN FALL THROUGH THE DOOR, WHICH CAN CAUSE INJURY TO THE PERSON AND DAMAGE TO THE AIRPLANE.

- (3) Open the access door, 312AR, for the horizontal ballscrew actuator and control modules (AMM 06-42-00/201).

E. Lubricate the Stabilizer Trim Control Module (Fig. 302)

S 643-028

- (1) Lubricate the stabilizer trim control module rod ends.

F. Put the Airplane Back to Its Usual Condition

S 863-016

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
 - (a) 11C12, STAB TRIM SHUTOFF L
 - (b) 11C13, STAB TRIM SHUTOFF CENTER

S 863-017

- (2) Remove DO-NOT-OPERATE tags and put the LEFT and CENTER STAB TRIM SHUTOFF valve switches on the P10 panel to NORM.

S 013-018

- (3) Close the forward stabilizer compartment access door, 312AR (AMM 06-42-00/201).

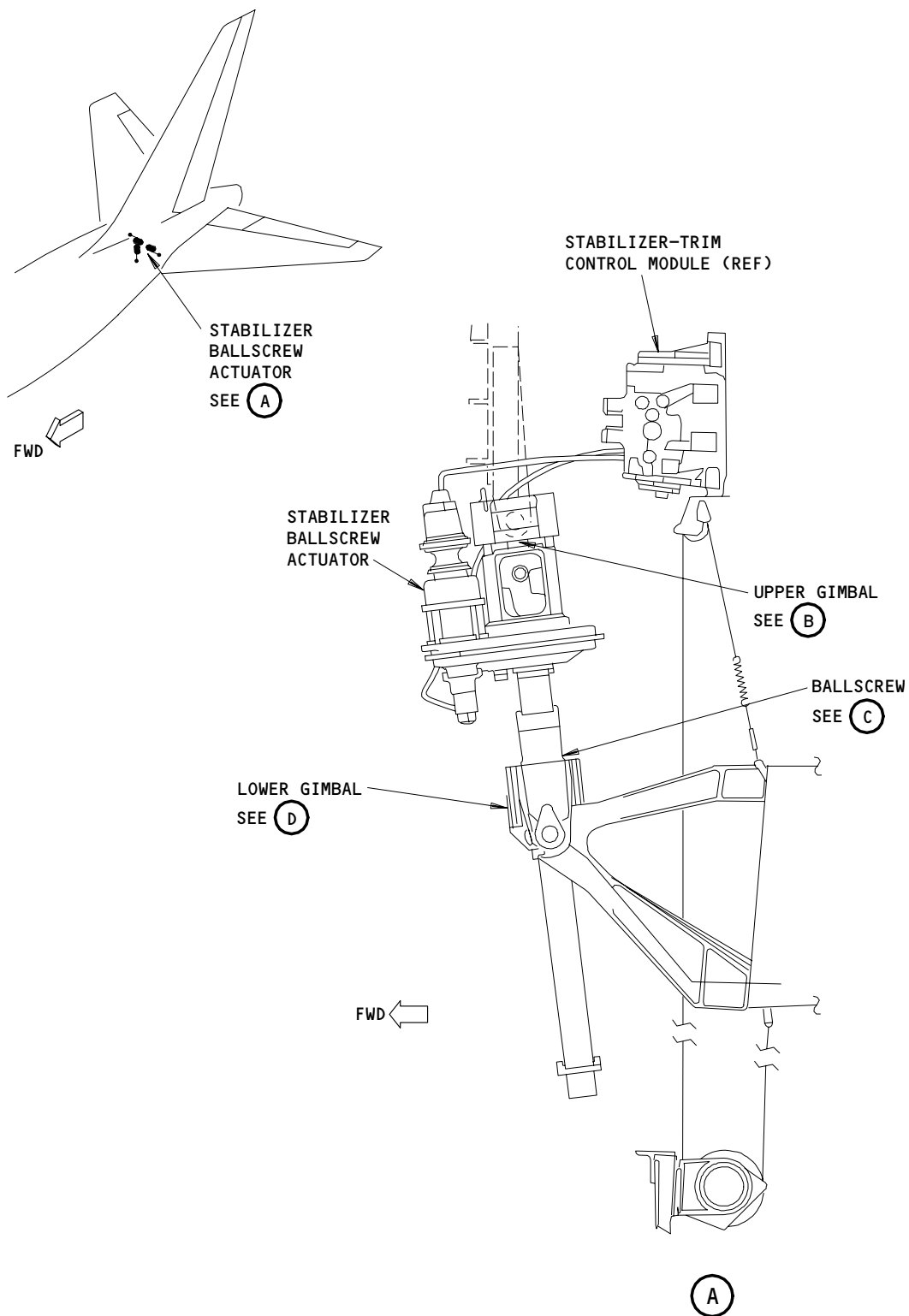
EFFECTIVITY

ALL

12-21-05

04

Page 306
Apr 22/08



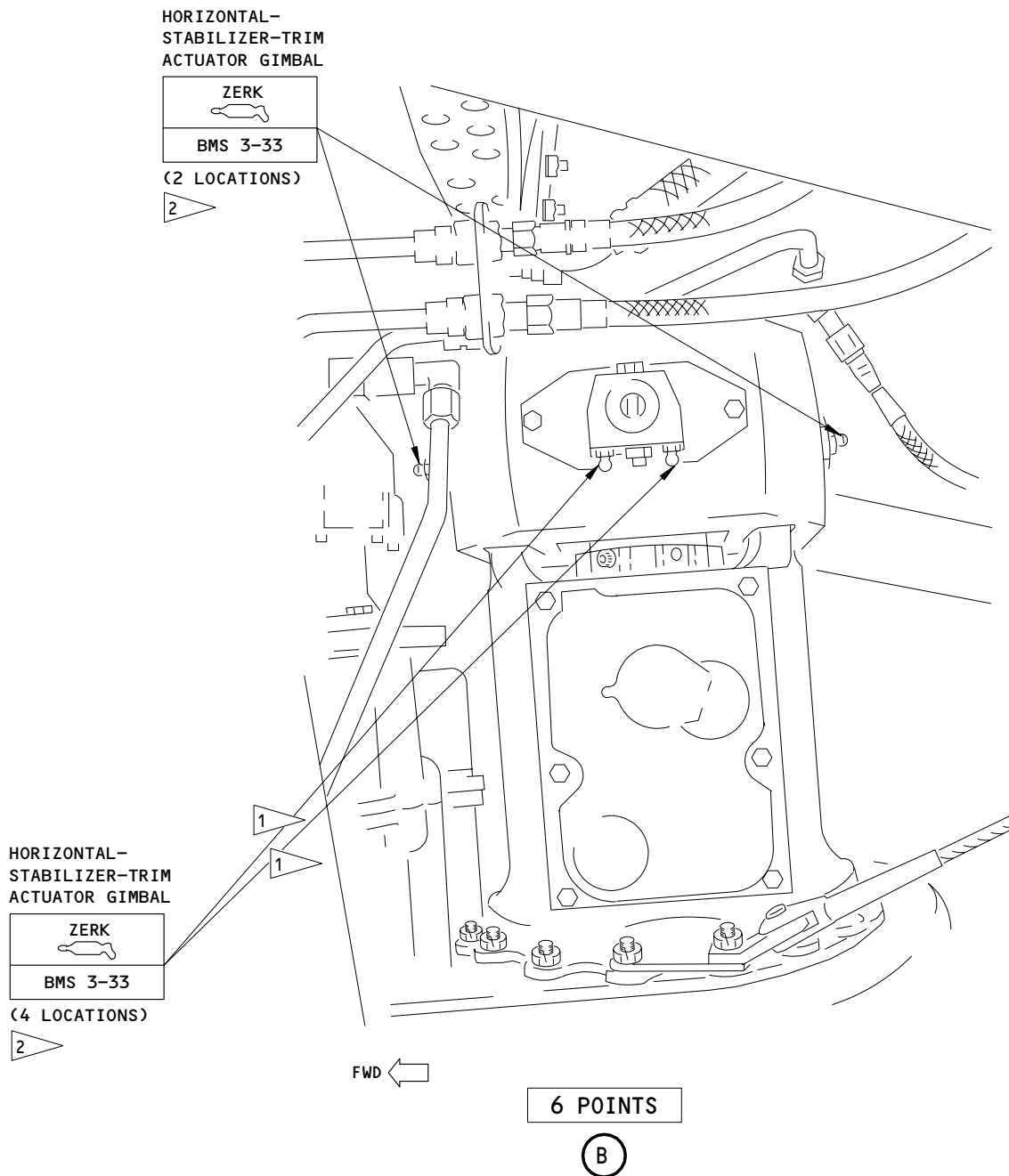
Stabilizer Ballscrew Actuator Servicing
Figure 301 (Sheet 1)

EFFECTIVITY	
	ALL

12-21-05

03

Page 307
Dec 22/05



- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN).
- 2 BMS 3-33 RECOMMENDED, MIL-PRF-23827 ALTERNATIVE.

Stabilizer Ballscrew Actuator Servicing
Figure 301 (Sheet 2)

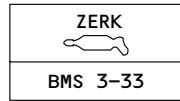
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12-21-05

BOEING

767 MAINTENANCE MANUAL

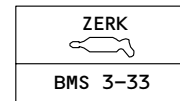
HORIZONTAL-TRIM
ACTUATOR-BALL
NUT/SCREW



(2 LOCATIONS)



HORIZONTAL-
STABILIZER-TRIM
ACTUATOR GIMBAL



(2 LOCATIONS)

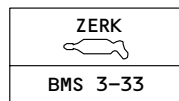


FWD ←

4 POINTS

(C)

HORIZONTAL-
STABILIZER-TRIM
ACTUATOR GIMBAL



(2 LOCATIONS)



(VIEW IN THE FORWARD DIRECTION)

2 POINTS

(D)

Stabilizer Ballscrew Actuator Servicing
Figure 301 (Sheet 3)

EFFECTIVITY

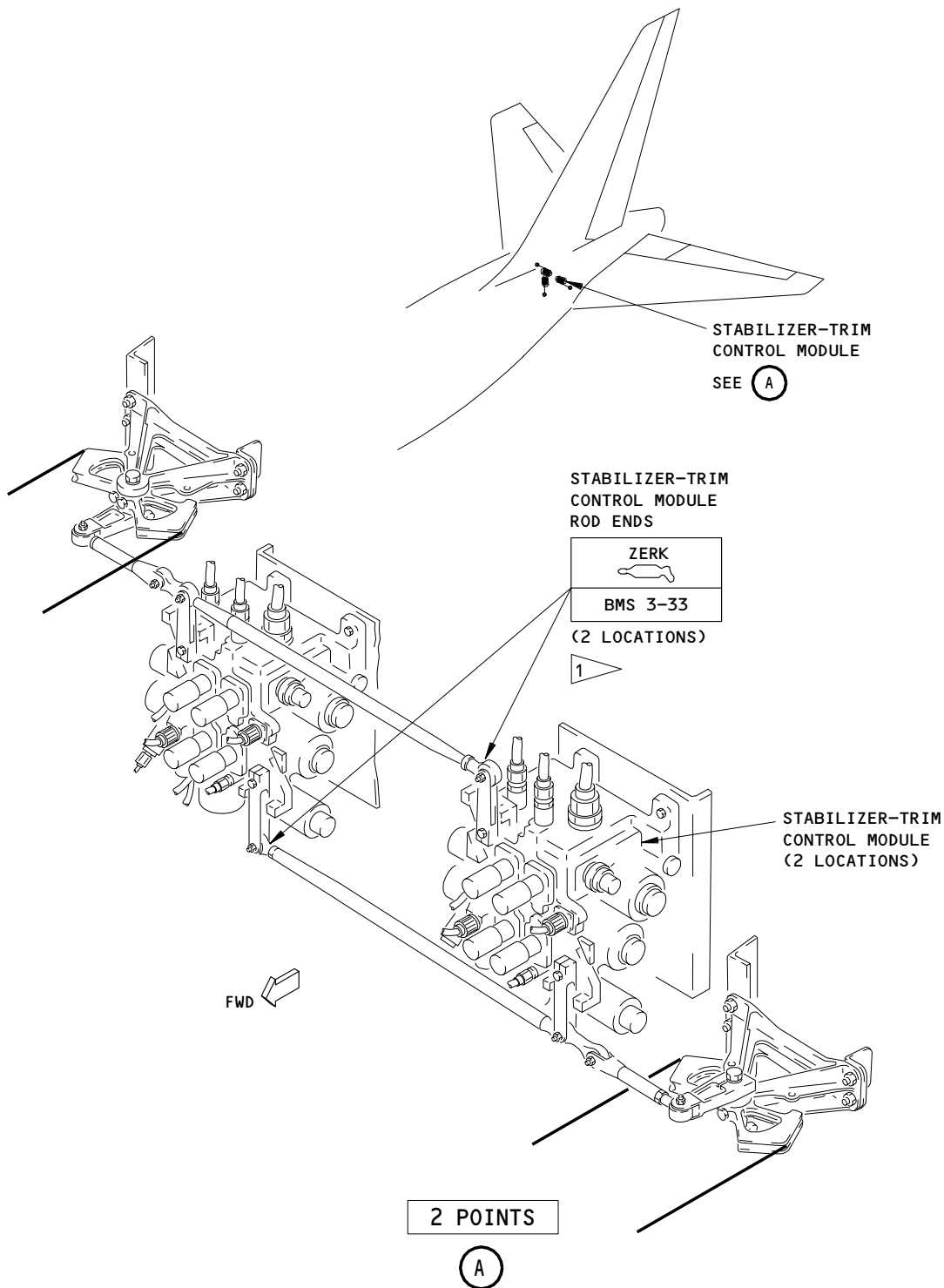
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12-21-05

02

Page 309
Aug 22/08

588902



1 BMS 3-33 RECOMMENDED, MIL-PRF-23827 ALTERNATIVE.

Stabilizer-Trim Control Module Servicing
Figure 302

EFFECTIVITY
AIRPLANES WITH ALT STAB TRIM
LEVERS ON THE CONTROL STAND

12-21-05

RUDDER AND RUDDER TRIM CONTROL SYSTEM – SERVICING (LUBRICATION)

1. General

- A. This procedure has these tasks:
(1) Rudder Hinges – Lubrication
(2) Rudder PCAs – Lubrication

TASK 12-21-06-613-016

2. Rudder Hinges – Lubrication

A. Equipment

- (1) Rudder PCA Locks – A27003-28 (3 are necessary)

B. Consumable Materials

- (1) D00633 Grease – BMS3-33 (Preferred)
D00015 Grease – BMS 3-24 (Alternate)
D00013 Grease – MIL-PRF-23827 (Alternate)

C. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
(2) AMM 24-22-00/201, Electrical Power – Control
(3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Access

- (1) Location Zones
324 Vertical Stabilizer – Rear Spar to Trailing Edge

(2) Access Panels

- | | |
|-------|-----------------------|
| 324BL | Rudder Hinge Fittings |
| 324PL | Rudder Hinge Fittings |
| 324WL | Rudder Hinge Fittings |
| 324GL | Bottom Rudder PCA |
| 324JL | Middle Rudder PCA |
| 324LL | Top Rudder PCA |

E. Prepare for the Lubrication

S 863-028

- (1) Supply electrical power (AMM 24-22-00/201).

S 863-029

- (2) Remove the pressure from the left, right, and center hydraulic systems and their reservoirs (AMM 29-11-00/201).

EFFECTIVITY

ALL

12-21-06

02

Page 301
Dec 22/08

S 483-030

- (3) Move the towing lever on the metering valve module to the tow position and install the towing lever lockpin in the nose gear.

S 863-031

- (4) Move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 panel to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.

S 863-032

- (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
11H17, FLT CONT SHUTOFF TAIL LEFT
11H18, FLT CONT SHUTOFF TAIL CTR
11H27, FLT CONT SHUTOFF TAIL RIGHT

S 013-033

- (6) Open access panels 324BL, 324GL, 324JL, 324PL, and 324WL (AMM 06-42-00/201).

S 483-027

WARNING: MAKE SURE THAT HYDRAULIC POWER IS REMOVED BEFORE THE PCA LOCKSET TOOL IS INSTALLED. THE RUDDER CAN MOVE QUICKLY AND CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (7) Do these steps to install the PCA locks on the three rudder PCAs.
(a) Move the right rudder pedal to its full forward position and hold it there until the PCA locks are installed.
(b) Manually move the rudder to its full right position and hold it there.

CAUTION: MAKE SURE ALL THREE PCA LOCKS ARE INSTALLED. THE RUDDER CAN BECOME DAMAGED IF HYDRAULIC POWER IS SUPPLIED TO A PCA THAT IS NOT LOCKED.

- (c) Install the PCA locks on the three PCAs.
(d) Release the rudder and the rudder pedal.

F. Rudder Hinge Fittings - Lubrication

S 643-019

- (1) Lubricate the rudder hinge fittings as shown (Fig. 301).
G. Put the Airplane Back to its Usual Condition

EFFECTIVITY

ALL

12-21-06

02

Page 302
Dec 22/08

S 863-034

WARNING: MAKE SURE THAT HYDRAULIC POWER IS REMOVED BEFORE THE PCA LOCKSET TOOL IS REMOVED. THE RUDDER CAN MOVE QUICKLY AND CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure that hydraulic power is removed (AMM 29-11-00/201).

S 863-051

- (2) Make sure that these circuit breakers on the overhead panel, P11, are open and DO-NOT-CLOSE tags are attached:
11H17, FLT CONT SHUTOFF TAIL LEFT
11H18, FLT CONT SHUTOFF TAIL CTR
11H27, FLT CONT SHUTOFF TAIL RIGHT

S 083-035

- (3) Do these steps to remove the PCA locks:
(a) Move the right rudder pedal to its full forward position and hold it there until the PCA locks are removed.
(b) Manually move the rudder to its full right position and hold it there.
(c) Remove the PCA locks from the PCAs.
(d) Release the rudder and the rudder pedal.

S 413-020

- (4) Close access panels 324BL, 324GL, 324JL, 324PL, and 324WL (AMM 06-42-00/201).

S 863-036

- (5) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
11H17, FLT CONT SHUTOFF TAIL LEFT
11H18, FLT CONT SHUTOFF TAIL CTR
11H27, FLT CONT SHUTOFF TAIL RIGHT

S 863-037

- (6) Remove DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 panel to ON.

S 083-038

- (7) Make sure the nose wheels are in their center position and remove the towing lever lockpin from the nose gear.

TASK 12-21-06-643-024

3. Rudder Power Control Actuators (PCA) - Lubrication

A. Equipment

- (1) Rudder PCA Locks - A27003-28 (3 are necessary)

EFFECTIVITY

ALL

12-21-06

02

Page 303
Dec 22/08

B. Consumable Materials

- (1) D00633 Grease - BMS3-33 (Preferred)
- D00013 Grease - MIL-PRF-23827 (Alternate)

C. References

- (1) AMM 06-42-00/201, Empennage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Access

- (1) Location Zone
 - 324 Vertical Stabilizer - Rear Spar to Trailing Edge
- (2) Access Panels
 - 324GL Rudder PCA
 - 324JL Rudder PCA
 - 324LL Rudder PCA

E. Prepare for the Lubrication

- S 863-039
 - (1) Supply electrical power (AMM 24-22-00/201).
- S 863-040
 - (2) Remove the pressure from the left, right, and center hydraulic systems and their reservoirs (AMM 29-11-00/201).
- S 863-041
 - (3) Move the towing lever on the metering valve module to the tow position and install the towing lever lockpin in the nose gear.
- S 863-042
 - (4) Move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 panel to OFF. Attach DO-NOT-OPERATE tags and make sure the switch position lights come on.
- S 863-043
 - (5) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
 - 11H17, FLT CONT SHUTOFF TAIL LEFT
 - 11H18, FLT CONT SHUTOFF TAIL CTR
 - 11H27, FLT CONT SHUTOFF TAIL RIGHT
- S 013-044
 - (6) Open access panels 324GL, 324JL, 324LL (AMM 06-42-00/201).

EFFECTIVITY

ALL

12-21-06

02

Page 304
Dec 22/08

S 483-045

WARNING: MAKE SURE THAT HYDRAULIC POWER IS REMOVED BEFORE THE PCA LOCKSET TOOL IS INSTALLED. THE RUDDER CAN MOVE QUICKLY AND CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (7) Do these steps to install the PCA locks on the three rudder PCAs.
 - (a) Move the right rudder pedal to its full forward position and hold it there until the PCA locks are installed.
 - (b) Manually move the rudder to its full right position and hold it there.

CAUTION: MAKE SURE ALL THREE PCA LOCKS ARE INSTALLED. THE RUDDER CAN BECOME DAMAGED IF HYDRAULIC POWER IS SUPPLIED TO A PCA THAT IS NOT LOCKED.

- (c) Install the PCA locks on the three PCAs.
- (d) Release the rudder and the rudder pedal.

F. Rudder PCAs - Lubrication

S 643-017

- (1) Lubricate the rudder PCAs as shown (Fig. 301).
- G. Put the Airplane Back to its Usual Condition

S 863-046

WARNING: MAKE SURE THAT HYDRAULIC POWER IS REMOVED BEFORE THE PCA LOCKSET TOOL IS REMOVED. THE RUDDER CAN MOVE QUICKLY AND CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure that hydraulic power is removed (AMM 29-11-00/201).

S 863-052

- (2) Make sure that these circuit breakers on the overhead panel, P11, are open and DO-NOT-CLOSE tags are attached:
11H17, FLT CONT SHUTOFF TAIL LEFT
11H18, FLT CONT SHUTOFF TAIL CTR
11H27, FLT CONT SHUTOFF TAIL RIGHT

S 083-047

- (3) Do these steps to remove the PCA locks:
 - (a) Move the right rudder pedal to its full forward position and hold it there until the PCA locks are removed.

EFFECTIVITY

ALL

12-21-06

02

Page 305
Dec 22/08

 **BOEING**
767
MAINTENANCE MANUAL

- (b) Manually move the rudder to its full right position and hold it there.
- (c) Remove the PCA locks from the PCAs.
- (d) Release the rudder and the rudder pedal.

S 413-018

- (4) Close access panels 324GL, 324JL, and 324LL (AMM 06-42-00/201).

S 863-048

- (5) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
 - 11H17, FLT CONT SHUTOFF TAIL LEFT
 - 11H18, FLT CONT SHUTOFF TAIL CTR
 - 11H27, FLT CONT SHUTOFF TAIL RIGHT

S 863-049

- (6) Remove DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF TAIL L, R, and C switches on the P61 panel to ON.

S 083-050

- (7) Make sure the nose wheels are in their center position and remove the towing lever lockpin from the nose gear.

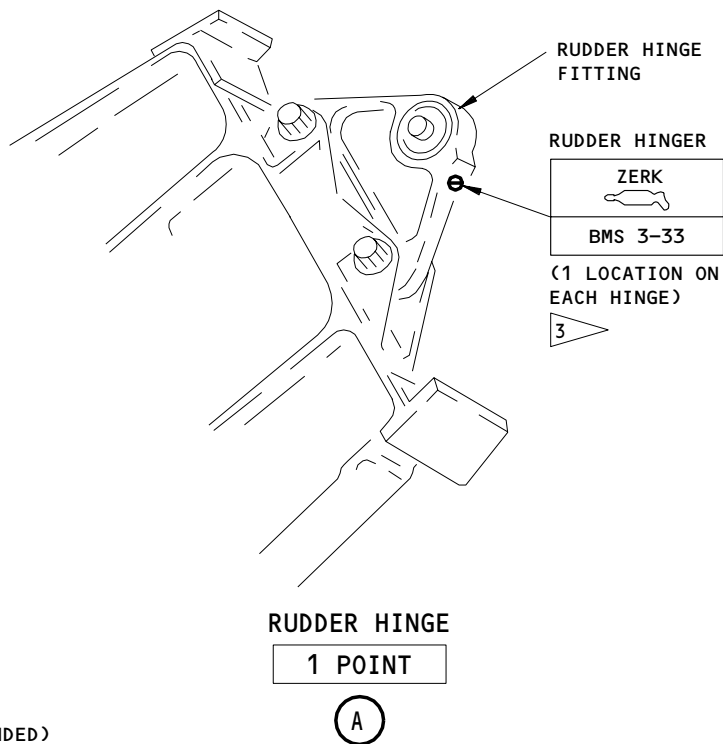
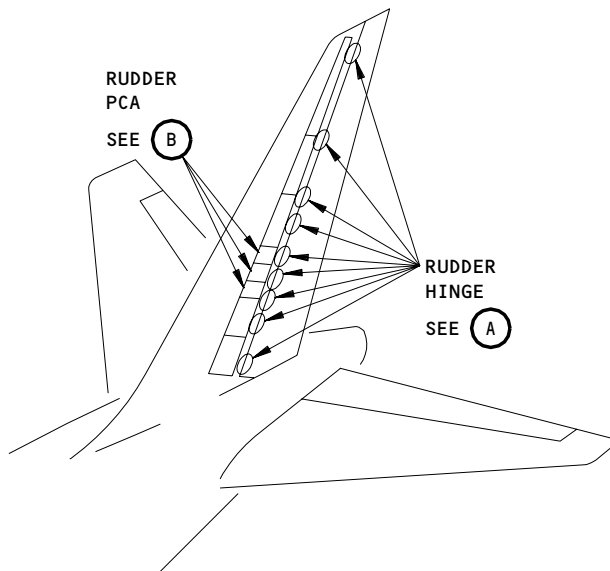
EFFECTIVITY

ALL

12-21-06

02

Page 306
Dec 22/08



3 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

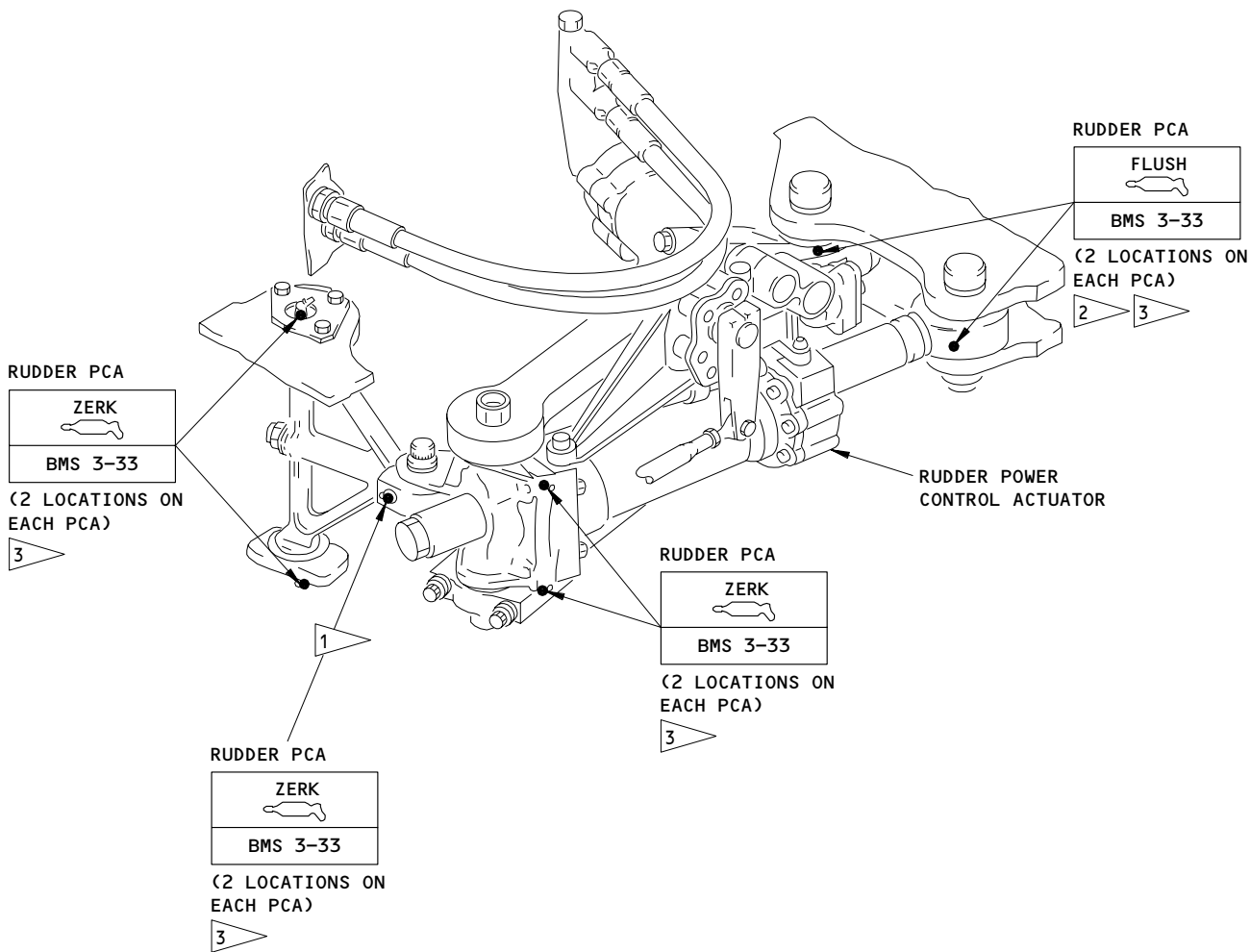
Rudder Power Control Actuator and Hinge Lubrication
Figure 301 (Sheet 1)

EFFECTIVITY	ALL
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12-21-06

01.1

Page 307
Aug 22/09



- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN).
- 2 LUBRICATE ONE OF THE TWO LUBE POINTS LOCATED ON EACH SIDE OF THE ROD END.
- 3 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Rudder Power Control Actuator and Hinge Lubrication
Figure 301 (Sheet 2)

EFFECTIVITY

ALL

12-21-06

01

Page 308
Apr 22/08

AILERON AND AILERON TRIM – SERVICING (LUBRICATION)

1. General

A. This procedure contains these tasks:

- Inboard Ailerons - Lubrication
- Outboard Ailerons - Lubrication
- Left LCCA Torque Tube - Lubrication

TASK 12-21-07-613-001

2. Inboard Ailerons - Lubrication

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Recommended)
- (2) D00013 Grease - MIL-PRF-23827 (Alternate)

B. Reference

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems - Maintenance Practices

C. Access

(1) Location Zones

561/661 Rear Spar to Trailing Edge

(2) Access Panels

561BB Wing TE Inboard Aileron Actuators

661BB Wing TE Inboard Aileron Actuators

D. Inboard Aileron - Lubrication

S 863-031

- (1) Make sure that pressure is removed from the left, right, and center hydraulic systems and their reservoirs (AMM 29-11-00/201).

S 863-032

- (2) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure that the amber switch-position legend lights come on.

S 863-033

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:

(a) 11H15, FLT CONT SHUTOFF WING L

(b) 11H16, FLT CONT SHUTOFF WING CTR

EFFECTIVITY

ALL

12-21-07

02

Page 301
Dec 22/07

- (c) 11H26, FLT CONT SHUTOFF WING R
- S 013-002
- (4) Open access panels 561BB and 661BB (AMM 06-44-00/201).
- S 643-003
- (5) Lubricate the inboard ailerons as shown (Fig. 301).
- S 413-004
- (6) Close access panels 561BB and 661BB (AMM 06-44-00/201).
- S 863-034
- (7) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
 - (a) 11H15, FLT CONT SHUTOFF WING L
 - (b) 11H16, FLT CONT SHUTOFF WING CTR
 - (c) 11H26, FLT CONT SHUTOFF WING R
- S 863-035
- (8) Remove DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the P61 panel to ON.

TASK 12-21-07-643-008

3. Outboard Aileron - Lubrication

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Recommended)
- (2) D00013 Grease - MIL-PRF-23827 (Alternate)

B. Reference

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems - Maintenance Practices

C. Access

- (1) Location Zones
 - 561/661 Rear Spar to Trailing Edge
- (2) Access Panels
 - 561MB Outboard Aileron Actuators
 - 661MB Outboard Aileron Actuators

D. Outboard Aileron - Lubrication

- S 863-036
- (1) Make sure that pressure is removed from the left, right, and center hydraulic systems and their reservoirs (AMM 29-11-00/201).
- S 863-037
- (2) Move the FLT CONTROL SHUTOFF WING L, C, and R switches on the right side panel, P61, to OFF. Attach DO-NOT-OPERATE tags and make sure that the amber switch-position legend lights come on.

EFFECTIVITY

ALL

12-21-07

01

Page 302
Dec 22/07

- S 863-038
- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11H15, FLT CONT SHUTOFF WING L
 - (b) 11H16, FLT CONT SHUTOFF WING CTR
 - (c) 11H26, FLT CONT SHUTOFF WING R
- S 013-005
- (4) Open access panels 561MB and 661MB (AMM 06-44-00/201).
- S 643-006
- (5) Lubricate the outboard aileron as shown (Fig. 302).
- S 413-007
- (6) Close access panels 561MB and 661MB (AMM 06-44-00/201).
- S 863-039
- (7) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel, P11:
- (a) 11H15, FLT CONT SHUTOFF WING L
 - (b) 11H16, FLT CONT SHUTOFF WING CTR
 - (c) 11H26, FLT CONT SHUTOFF WING R
- S 863-040
- (8) Remove DO-NOT-OPERATE tags and move the FLT CONTROL SHUTOFF WING L, C, and R switches on the P61 panel to ON.

TASK 12-21-07-643-014

4. Left LCCA Torque Tube - Lubrication

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Recommended)
- (2) D00013 Grease - MIL-PRF-23827 (Alternate)

B. References

- (1) AMM 32-00-15/201, Main Gear Door Locks
- (2) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

(1) Location Zones

- 143 L/H Main Landing Gear Wheel Well
- 144 R/H Main Landing Gear Wheel Well
- 730 L/H Main Landing Gear and Doors

D. Left LCCA Torque Tube - Lubrication

S 213-009

- (1) Make sure the down locks are installed on the nose and main landing gear (AMM 32-00-20/201).

EFFECTIVITY

ALL

12-21-07

04

Page 303
Aug 22/07

S 493-010

WARNING: USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 643-011

- (3) Lubricate the left LCCA torque tube as shown (Fig. 303).

S 643-027

- (4) Lubricate the quadrant rod ends as shown (Fig. 303).

S 093-013

WARNING: USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (5) Remove the door locks from the main landing gear and close the doors (AMM 32-00-15/201).

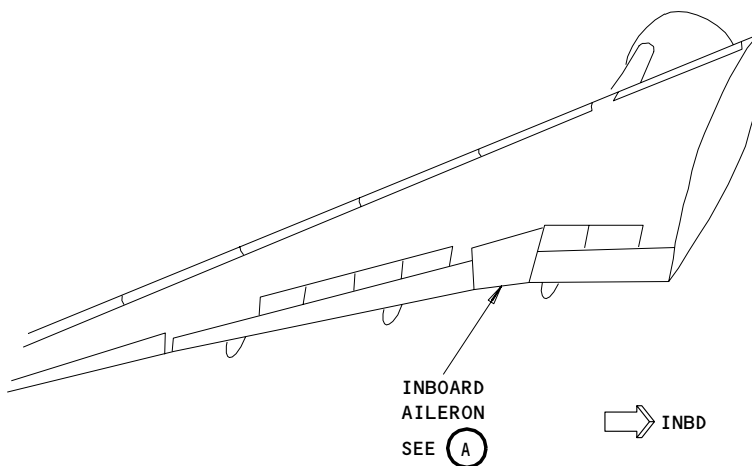
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ALL

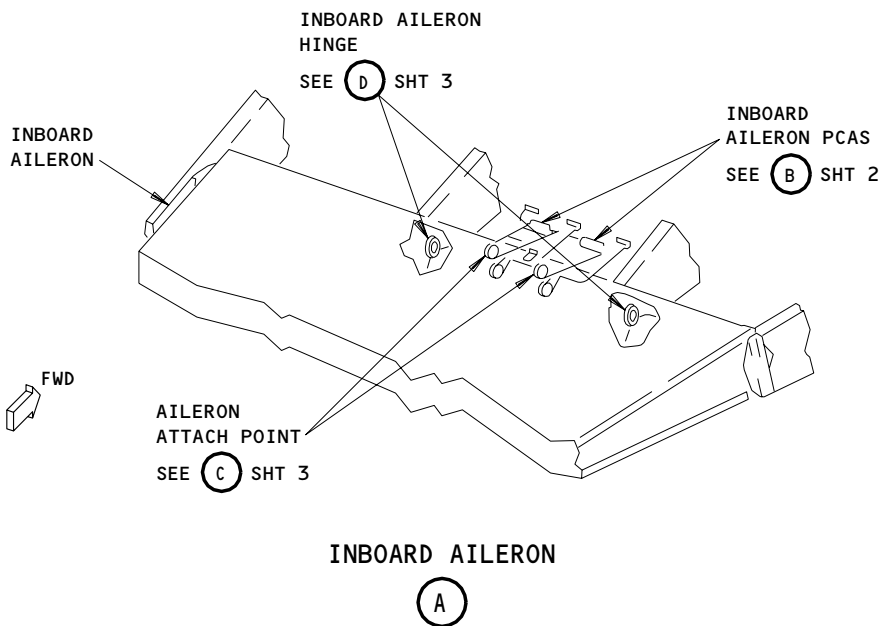
12-21-07

02

Page 304
Apr 22/07



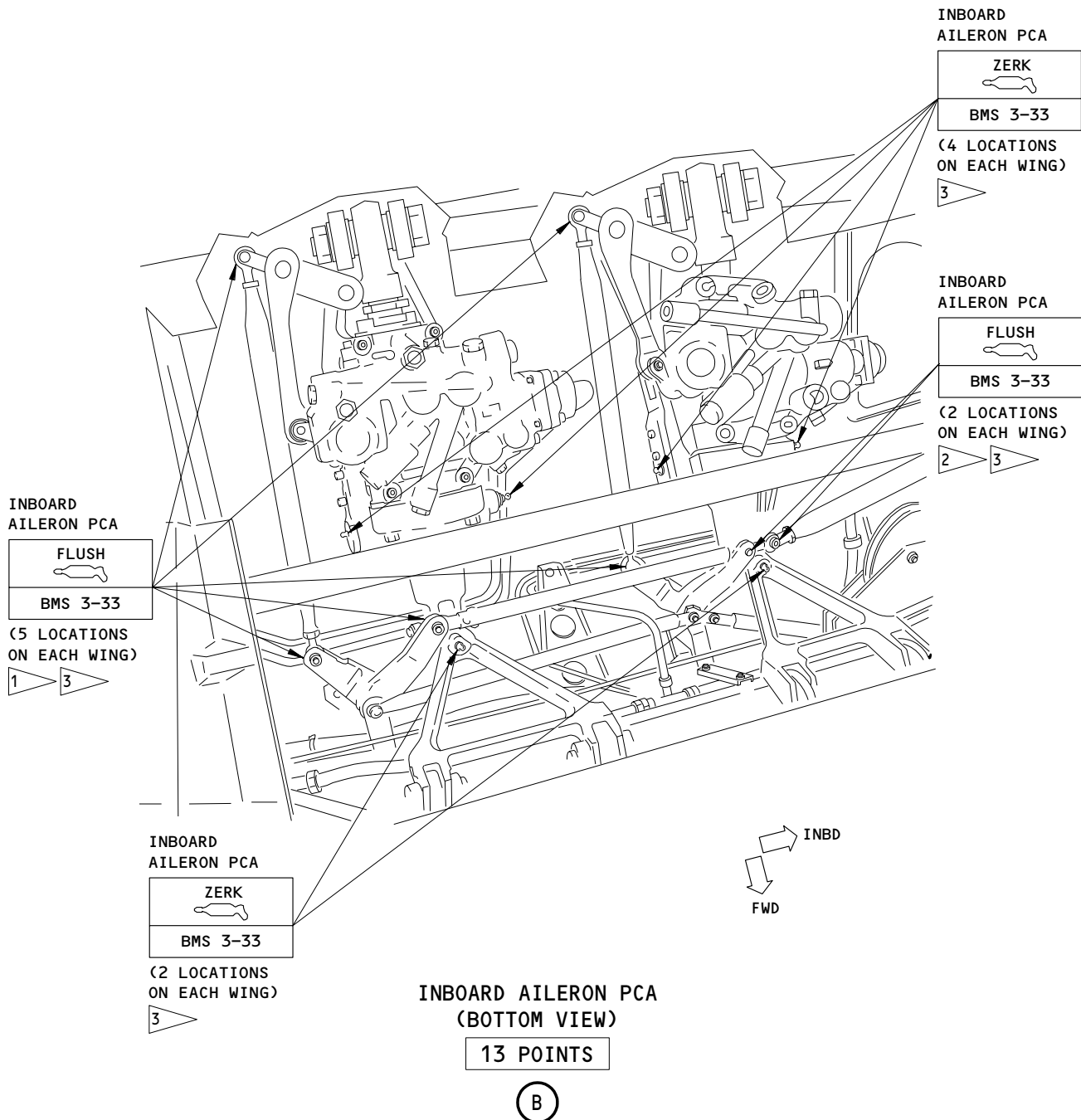
LEFT WING
(RIGHT WING IS OPPOSITE)



Inboard Aileron Lubrication
Figure 301 (Sheet 1)

EFFECTIVITY	ALL
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12-21-07

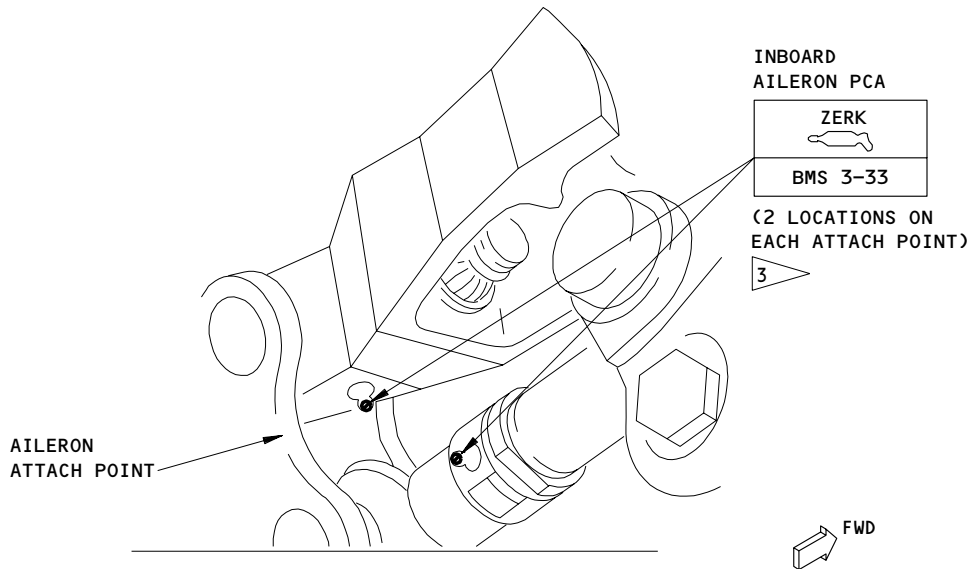


- 1 LUBRICATE ONE OF THE TWO LUBE POINTS LOCATED ON EACH SIDE OF THE ROD END
- 2 LUBRICATE ONE OF THE TWO LUBE POINTS ON EACH BEARING
- 3 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Inboard Aileron Lubrication
Figure 301 (Sheet 2)

EFFECTIVITY	ALL
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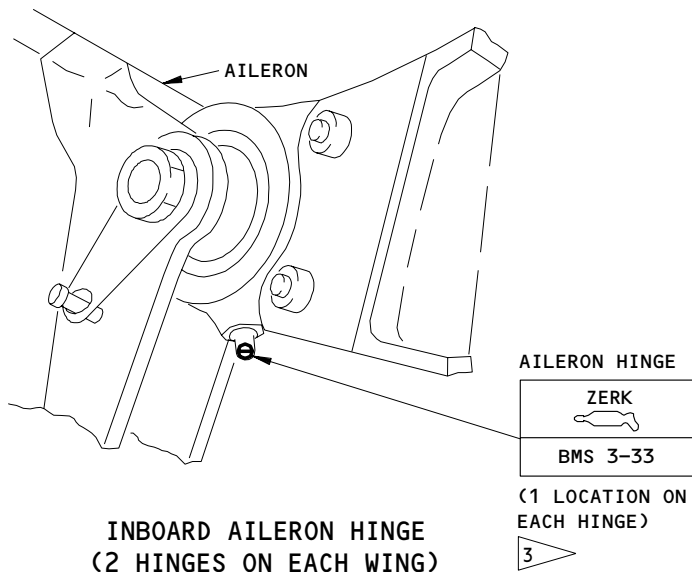
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AILERON ATTACH POINT
(2 AILERON ATTACH POINTS ON EACH WING)

2 POINTS

(C)



INBOARD AILERON HINGE
(2 HINGES ON EACH WING)

1 POINT

(D)

Inboard Aileron Lubrication
Figure 301 (Sheet 3)

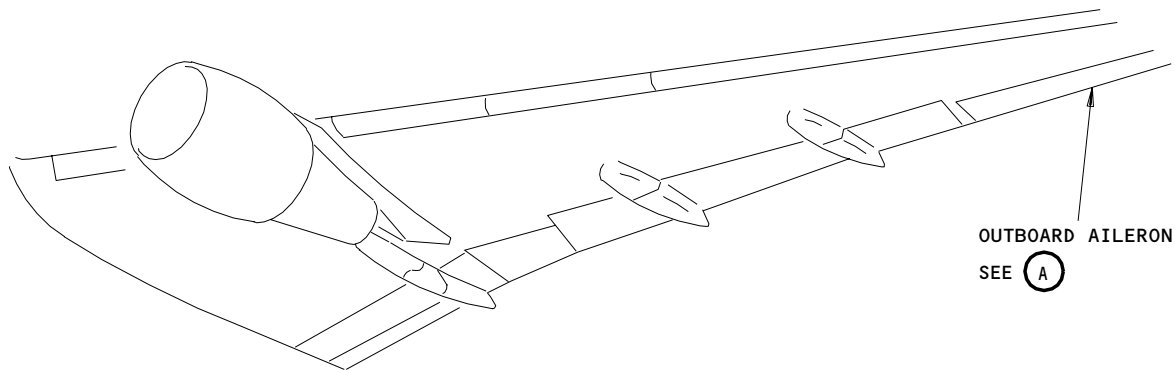
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ALL

12-21-07

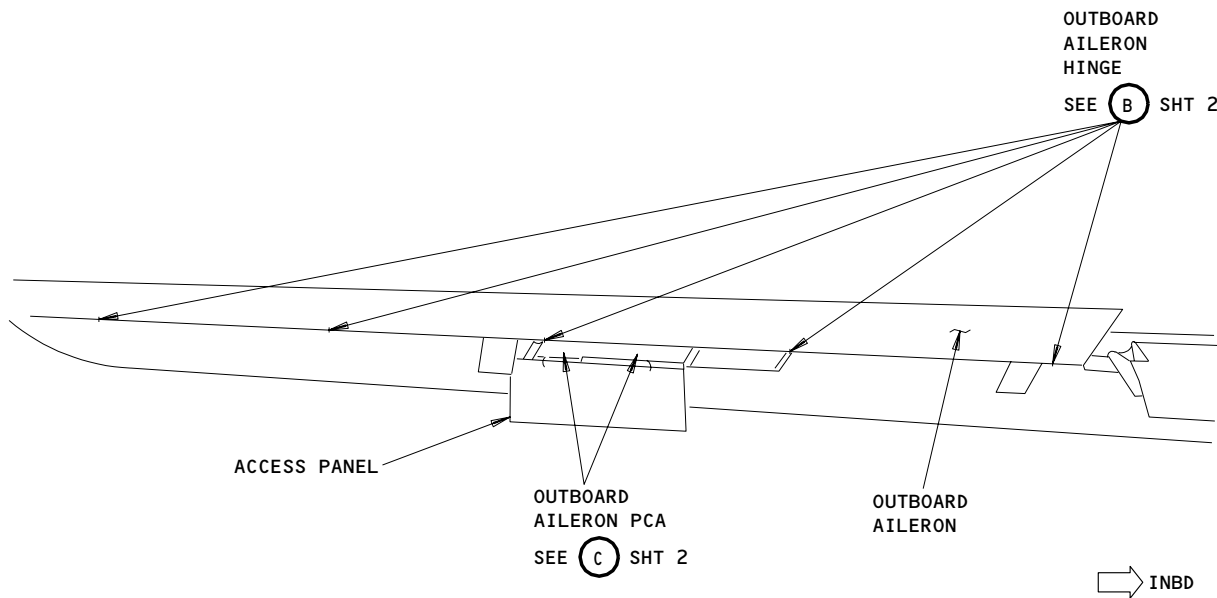
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Page 307
Apr 22/07



OUTBOARD AILERON
SEE (A)

LEFT WING
(RIGHT WING IS OPPOSITE)



OUTBOARD
AILERON
HINGE
SEE (B) SHT 2

ACCESS PANEL

OUTBOARD
AILERON PCA
SEE (C) SHT 2

OUTBOARD
AILERON

INBD

OUTBOARD AILERON

(A)

Outboard Aileron Lubrication
Figure 302 (Sheet 1)

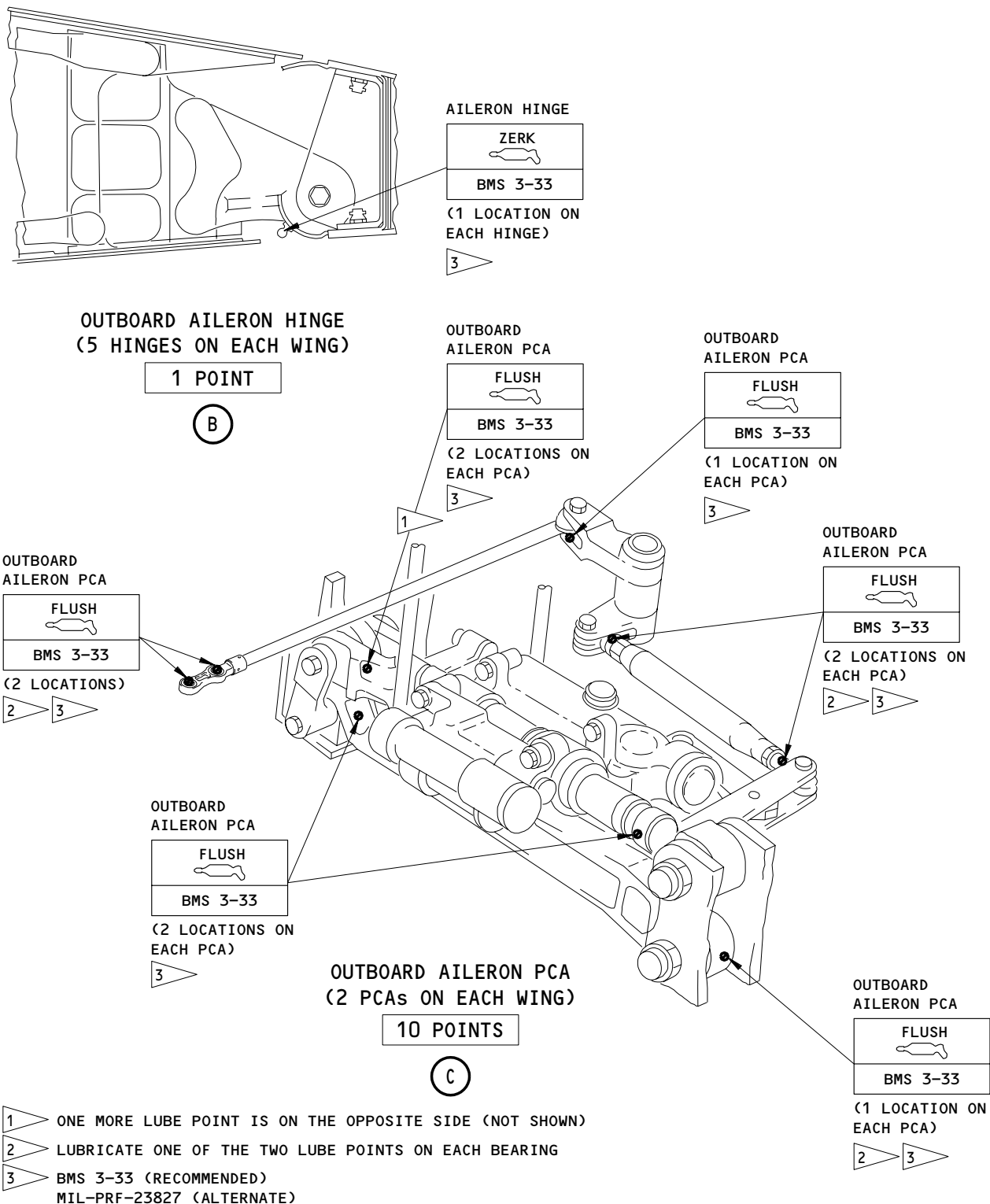
EFFECTIVITY	ALL
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12-21-07

02

Page 308
Apr 22/07

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Outboard Aileron Lubrication
Figure 302 (Sheet 2)

EFFECTIVITY

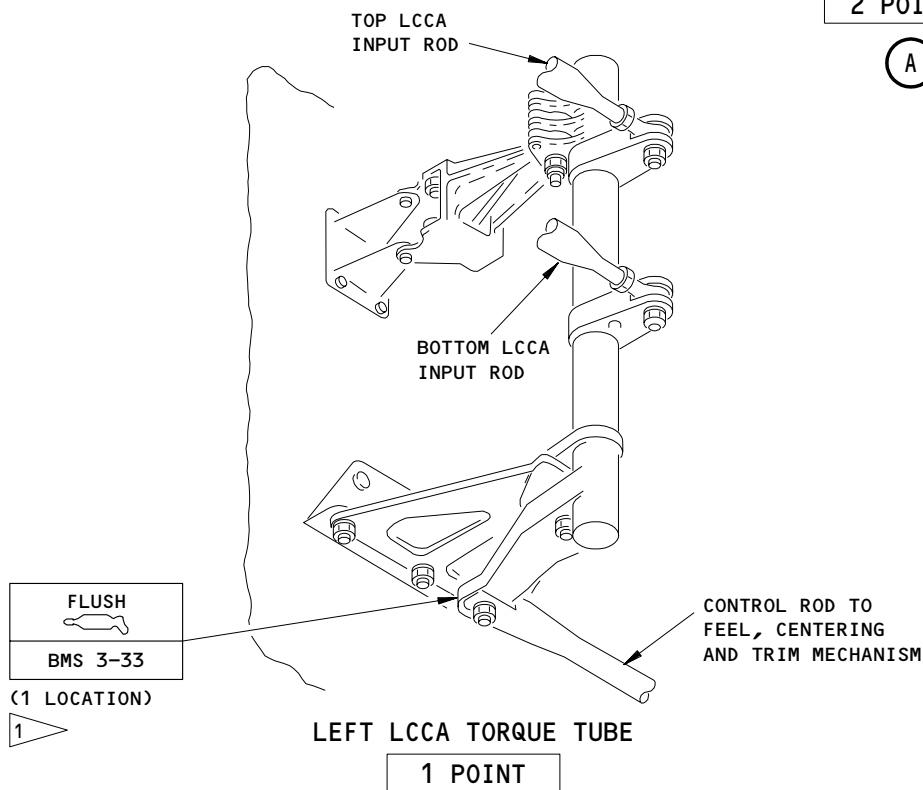
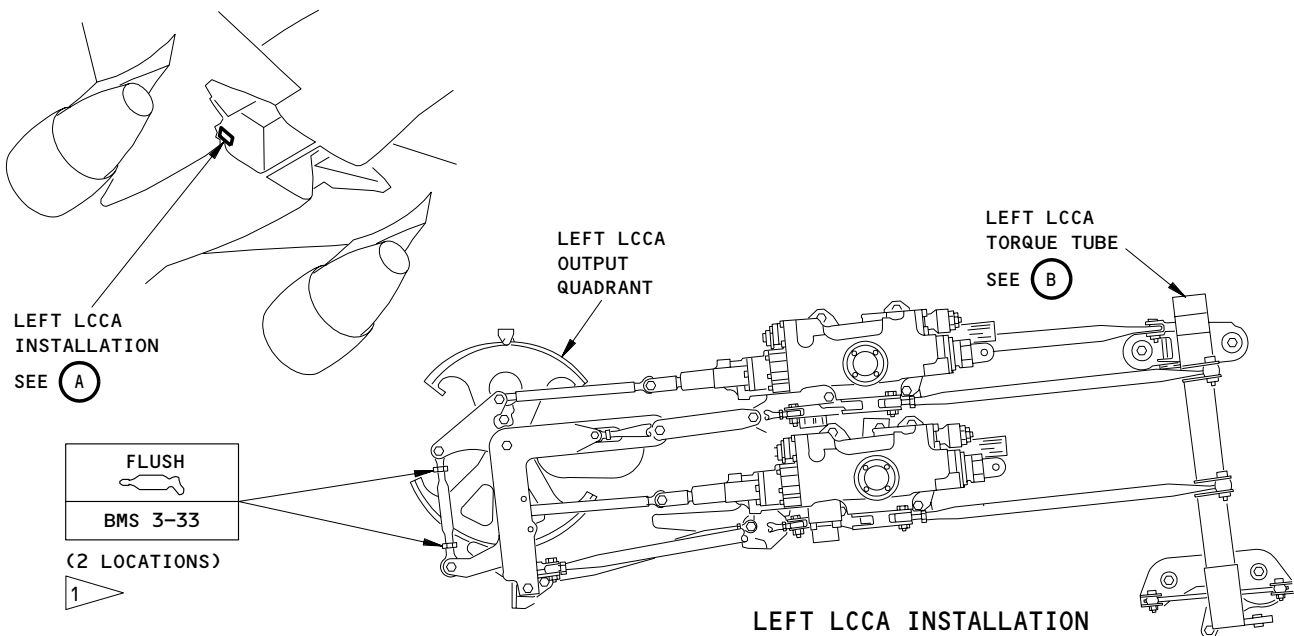
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12-21-07

02

Page 309
Aug 22/08

612267



1 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Lubrication for Left LCCA Torque Tube
Figure 303

EFFECTIVITY	ALL
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12-21-07

01

Page 310
Apr 22/07

LEADING EDGE SLAT SYSTEM – SERVICING (LUBRICATION/OIL
REPLENISHMENT AND CORROSION PROTECTIVE TREATMENT)

1. General

- A. This procedure gives instructions to service the leading edge (LE) slat system.
- B. Whenever changing a brand name grease, flush out the old grease to prevent intermixing. Greases that are thickened with clay and those thickened with lithium soap are incompatible. Therefore, intermixing of brand name greases that use different systems must be prevented.
- C. This servicing (lubrication/oil replenishment/corrosion protective treatment) task is divided into these areas:

NOTE: Refer as necessary to the applicable figure(s) to service each area.

- (1) The inboard slat lubrication (Fig. 301).
- (2) The outboard slat lubrication (Fig. 302).
- (3) The lubrication of drive shaft couplings (Fig. 303).
- (4) The lubrication of the side brace links in the inboard slats (Fig. 304).
- (5) The corrosion protective treatment of the track housing and drain tube for the outboard slats (Fig. 305).
- (6) The oil replenishment of (inboard or outboard slat PDU) alternate drive motor P/N 4134T100 (S256T011) (Fig. 306).

TASK 12-21-08-603-001

2. Service the Leading Edge Slat System

A. Equipment

- (1) Leading Edge Slat Groundlock – A27007-1
(2 Necessary)
- (2) Leading Edge Slat Lubrication Tool – A57007
- (3) Circuit Breaker Lockout Clip
(Commercially Available)

B. Consumable Materials

- (1) D00633 Grease – BMS 3-33 (Preferred)
- (2) D00013 Grease – MIL-PRF-23827 (Alternate)

EFFECTIVITY

ALL

12-21-08

05

Page 301
Apr 22/06

- (3) D00070 Oil - Hydraulic, Petroleum Base, MIL-H-5606
- (4) G00009 Organic Corrosion Inhibiting Compound -
BMS 3-23, Type II (any class or grade)

C. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-81-00/201, Leading Edge Slat System
- (4) AMM 29-11-00/201, Main (Left, Right and Center) Hydraulic Systems
- (5) AMM 32-00-15/201, Landing Gear Door Locks
- (6) AMM 32-00-20/201, Landing Gear Downlocks
- (7) AMM 78-31-00/201, Thrust Reverser System

D. Access

(1) Location Zones

211/212	Control Cabin
510/610	Wing Leading Edge - Inboard
520/620	Wing Leading Edge - Outboard
730/740	Left/Right Main Landing Gear and Doors

(2) Access Panels

511BB/611BB	Inboard Lower Leading Edge (L and R Wings)
511CB/611CB	LE Slat Power Drive Unit (Left and Right Wings)
511DB/611DB	Inboard LE Slat Side Brace Links
511FB/611FB	Inboard Lower Leading Edge (L and R Wings)
511KB/611KB	Inboard Lower Leading Edge, Pressure Relief Panel
511LB/611LB	Inboard Lower Leading Edge (L and R Wings)
511NB/611NB	Inboard Lower Leading Edge (L and R Wings)
511QB/611QB	Inboard Lower Leading Edge (L and R Wings)
511RB/611RB	Inboard Lower Leading Edge (L and R Wings)
521AEB/621AEB	Outboard Lower Leading Edge (L and R Wings)
521AFB/621AFB	Outboard Lower Leading Edge (L and R Wings)
521ALB/621ALB	Outboard Lower Leading Edge (L and R Wings)
521AMB/621AMB	Lower LE, Pressure Relief Panel (L and R Wings)
521BB/621BB	Outboard Lower Leading Edge (L and R Wings)
521EB/621EB	Outboard Lower Leading Edge (L and R Wings)
521HB/621HB	Outboard Lower Leading Edge (L and R Wings)
521JB/621JB	Outboard Lower Leading Edge (L and R Wings)
521PB/621PB	Outboard Lower Leading Edge (L and R Wings)
521RB/621RB	Outboard Lower Leading Edge (L and R Wings)
621SB	Outboard Lower Leading Edge (Right Wing)
621QB	Outboard Lower Leading Edge (Right Wing)
521TB/621TB	Outboard Lower Leading Edge (L and R Wings)
521YB/621YB	Outboard Lower Leading Edge (L and R Wings)
521ZB/621ZB	Outboard Lower Leading Edge (L and R Wings)

EFFECTIVITY

ALL

12-21-08

04

Page 302
Apr 22/08

- (3) Access Doors
533AB/633AB Dry Bay - Inboard Lower LE (L and R Wings)
- E. Prepare for Servicing

S 813-027

WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: USE THE PROCEDURE IN AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Do these procedures: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201) and open the doors for the landing gears and install the door locks (AMM 32-00-15/201).

S 213-005

- (2) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 213-032

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

CAUTION: MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (3) Make sure that the TE flaps and LE slats are in the fully extended position, and that the flap control lever is in the 30-unit detent.

S 493-004

- (4) Attach a DO-NOT-OPERATE tag to the flap control lever.

EFFECTIVITY

ALL

12-21-08

05

Page 303
Apr 22/08

- S 863-008
- (5) Open these circuit breakers on the main power distribution panel, P6, and install locks and attach DO-NOT-CLOSE tags:
- (a) 6D21, ALTN SLAT INBD PWR
 - (b) 6F24, ALTN SLAT OUTBD PWR
- S 863-009
- (6) Open these circuit breakers on the overhead panel, P11, and install locks and attach DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
 - (b) 11H24, SLAT ALTN CONT OUTBD
- S 863-010
- (7) Remove the power from the center hydraulic system (AMM 29-11-00/201), if the center hydraulic system is pressurized.
- S 013-011
- (8) Remove the access panel 611CB to get to the inboard slat PDU (AMM 06-44-00/201).
- S 013-002
- (9) Remove the access panel 511CB to get to the outboard slat PDU (AMM 06-44-00/201).
- S 863-012
- (10) Move the manual override levers on the bypass valve for the inboard LE slat and outboard LE slat power drive unit (PDU) to the No. 1 (bypass) position (Fig. 306).
- S 493-003
- (11) Install a DO-NOT-OPERATE tag on the manual override lever.
- S 493-013
- (12) Install the PDU locks in the inboard LE slat and outboard LE slat PDUs (Fig. 306).

EFFECTIVITY

ALL

12-21-08

05

Page 304
Dec 22/02

F. Procedure

S 013-089

- (1) Remove the applicable access panels for lubrication of the outboard slat main and auxiliary track rollers (AMM 06-44-00/201).

S 013-088

- (2) Remove the applicable access panels for lubrication of the inboard slat main and auxiliary track rollers (AMM 06-44-00/201).

S 013-053

- (3) Remove the applicable access panels for oil replenishment of (inboard or outboard slat PDU) alternate drive motors with oil fill port (AMM 06-44-00/201).

S 013-036

- (4) Remove the applicable access panels for oil replenishment of the (inboard or outboard slat rotary actuator) gearboxes that have oil fill and drain plugs (AMM 06-44-00/201).

S 293-101

WARNING: DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (5) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 643-086

- (6) Lubricate the outboard slat main and auxiliary track rollers that are installed with bolts that have lube fitting (Fig. 302).

S 643-091

- (7) Lubricate the outboard slat auxiliary track rollers that are installed with solid bolts that do not have lube fitting. Use the tool A57007, or a bolt with lube fitting (Fig. 302):
 - (a) Manually move the outboard slat until the solid bolt at the aft end of the auxiliary track arm (Detail B, Fig. 302) is accessible for removal (AMM 27-81-00/201, Manually Extend and Retract the leading edge slats without Airplane Power).

EFFECTIVITY

ALL

12-21-08

04

Page 305
Aug 22/08

 **BOEING**
767
MAINTENANCE MANUAL

- (b) Disconnect and remove the solid (non-lube fitting) bolt holding the roller bearing with your hand.

NOTE: Be careful when you pull the bolt out, the bearing can fall out of the joint.
Keep all disassembled parts together.

- (c) Do a visual check for roller bearing damage.

NOTE: The bearing must not show any signs of cracks on the inner or outer race, no tears in the liner, and no resistance found when turning the bearing by hand.

- (d) Lubricate the roller bearing with the tool A57007, if available.

- (e) If the tool A57007 is not available, install (on wing) the roller bearing with a bolt that has a lube fitting path and lubricate the roller bearing.

NOTE: You might have to work around with the bolt and the roller bearing to align the lube groove in the bolt with the lube port in the roller bearing.

- 1) Manually move the slat (as necessary) until the holes in the aft end of the auxiliary arm aligns with the slot in the auxiliary track for smooth removal/installation of the bolts (AMM 27-81-00/201, Manually Extend and Retract the Leading Edge slats without Airplane Power).
- 2) Remove the bolt with lube fitting after you lubricated the roller bearing.

- (f) Apply BMS 3-33 grease to the solid bolt and the roller bearing.

- (g) Install the lubricated roller bearing with the solid (without lube fitting) bolt in the auxiliary track/arm joint.

NOTE: Remove all grease from the bolt threads immediately before you install the nut or incorrect torque setting will occur.

EFFECTIVITY

ALL

12-21-08

02

Page 306
Dec 22/07

(h) Tighten the nut between 30 to 50 pound-inches and install a cotter pin.

S 643-087

(8) Lubricate the inboard slat main and auxiliary track rollers that are installed with bolts that have lube fitting (Fig. 301).

S 643-092

(9) Lubricate the inboard slat auxiliary track rollers that are installed with solid bolts that do not have lube fitting. Use the tool A57007, or a bolt with lube fitting (Fig. 301):

(a) Manually move the inboard slat until the solid bolt at the aft end of the auxiliary track arm (Detail B, Fig. 301) is accessible for removal (AMM 27-81-00/201, Manually Extend and Retract the leading edge slats without Airplane Power).

(b) Disconnect and remove the solid bolt holding the roller bearing with your hand.

NOTE: Be careful when you pull the bolt out, the bearing can fall out of the joint. Keep all disassembled parts together.

(c) Do a visual check for roller bearing damage.

NOTE: The bearing must not show any signs of cracks on the inner or outer race, no tears in the liner, and no resistance found when turning the bearing by hand.

(d) If the tool A57007 is not available, install (on wing) a bolt with lube fitting path and lubricate the roller bearing.

NOTE: If you use a bolt with lube fitting to lubricate the roller bearing, you might have to work around with the bolt and bearing to align the lube groove in the bolt with the lube port in the bearing.

1) Manually move the slat (as necessary) until the holes in the aft end of the auxiliary arm aligns with the slot in the auxiliary track for smooth removal/installation of the bolts (AMM 27-81-00/201, Manually Extend and Retract the Leading Edge slats without Airplane Power).

EFFECTIVITY

ALL

12-21-08

02

Page 307
Apr 22/08

- 2) Remove the bolt with lube fitting after you lubricated the roller bearing.
- (e) Apply BMS 3-33 grease to the solid bolt and the roller bearing.
- (f) Install the lubricated roller bearing with the solid (without lube fitting) bolt at the auxiliary track/arm joint.

NOTE: Remove all grease from the bolt threads immediately before you install the nut or incorrect torque setting will occur.

- (g) Tighten the nut between 290 to 510 pound-inches.

S 643-055

- (10) Lubricate the inboard slat side brace links (Fig. 304).

S 643-056

- (11) Lubricate the slat drive shaft couplings (Fig. 303).

NOTE: To lubricate the coupling inside the mounting structure of the Side of Body Angle Gearbox for the outboard slats, remove the access cover (Fig. 303).

S 643-033

- (12) If you cannot inject grease (lubricant does not squeeze out between parts) through clogged roller bearing paths, clear its lube paths with these steps:
 - (a) Remove the bearing and the lubrication fitting (AMM 27-81-01/401).
 - (b) Use a squeeze bottle or similar device to force solvent (MEK, P-D-680 Stoddard, and TT-N-95 Naphtha are acceptable) into the lubrication path.

NOTE: The lubrication path is clear when the solvent easily flows through the lubrication path and is clean when exiting. It may be necessary to allow the solvent to stand in the grease path for five minutes to dissolve obstructions.

- (c) Clean and dry solvent from the grease path with compressed air.
- (d) Install a new lubrication fitting.
- (e) Inspect the bearing and replace it if damaged.

EFFECTIVITY

ALL

12-21-08

02

Page 308
Apr 22/08

S 013-096

- (13) Remove the access panels 521AFB, 521ZB, 521TB, 521JB, 521EB and 521BB, to get access to the openings of the nine slat track housing cans at the left wing (AMM 06-44-00/201).

S 013-097

- (14) Remove the access panels 621BB, 621EB, 621JB, 621TB, 621ZB and 621AFB, to get access to the openings of the nine slat track housing cans at the right wing (AMM 06-44-00/201)

S 013-098

- (15) Remove the 533AB dry bay access door aft of slat 6 (next to the right side of left wing/engine strut) for access to the drain openings inside the dry bay/wing structure (AMM 28-11-06/401, AMM 06-44-00/201).

S 013-099

- (16) Remove the 633AB dry bay access door aft of slat 7 (next to the left side of right wing/engine strut) for access to the drain openings inside the dry bay/wing structure (AMM 28-11-06/401, AMM 06-44-00/201).

S 643-035

- (17) Apply corrosion protective coating BMS 3-23, Type II (any class or grade) to slat track housing cans and drain tubes with the steps that follow (Fig. 305):
- Plug drain openings at the bottom surface of left wing for slats 1 thru 4.
 - Plug drain openings at the bottom surface of right wing for slats 9 thru 12.
 - Plug drain opening for slat 5 inside dry bay/wing structure.
 - Plug drain opening for slat 8 inside dry bay/wing structure.
 - Use a squeeze bottle with nozzle or hose, or any similar device and fill with BMS 3-23 (thru the openings of slat track housings) the can of slat track housing and the drain tube.
 - Remove the plugs and drain excess BMS 3-23.
 - Blow air through the tubes (120 PSI maximum) from the drain openings at the wing bottom surface and from the drain openings inside the dry bay/wing structure.

S 613-038

- (18) Oil service airplanes with alternate (electric) drive motor P/N 4134T100 (S265T011) or P/N 4135T100 (S256T011), with the steps that follow (Fig. 306):
- Remove the electric motor from the PDU, if it is necessary (AMM 27-81-11/401).
 - Remove plug from higher oil port of alternate drive motor.
 - Add hydraulic fluid MIL-H-5606 to the (inboard or outboard slat PDU) alternate drive motor to keep it full of oil, and install the plug in the oil port (Fig. 306).

EFFECTIVITY

ALL

12-21-08

05

Page 309
Aug 22/08

(d) Install the electric motor on the PDU, if removed
(AMM 27-81-11/401).

G. Put the Airplane Back to Its Usual Condition

S 863-019

- (1) Remove the DO-NOT-OPERATE tag and move the manual override lever on the bypass valve for the inboard and outboard PDUs to the No. 2 (normal) position (Fig. 306).

S 093-026

WARNING: USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 093-020

- (3) Remove the PDU locks from the inboard LE slat and outboard LE slat PDUs (Fig. 306).

S 293-100

WARNING: DO NOT LET OBJECTS GET IN THE HOUSING ASSEMBLY OF THE SLAT TRACK. THIS WILL HELP PREVENT A PUNCTURE OF THE HOUSING ASSEMBLY THAT COULD CAUSE A FUEL LEAK. THE FUEL LEAK COULD CAUSE A FIRE AND POSSIBLE DEATH OR INJURY TO PERSONNEL.

- (4) Keep clean and free of all unwanted objects (FOD), the housing (can) assemblies of the slat main tracks, at all time.

S 413-021

- (5) Install the access panels/doors that you removed for the tasks of lubrication, oil replenishment, and/or protective coating application (AMM 06-44-00/201, AMM 28-11-06/401).

S 863-022

- (6) Remove the DO-NOT-CLOSE tags and locks and close these circuit breakers on the P6 panel:
(a) 6D21, ALTN SLAT INBD PWR
(b) 6F24, ALTN SLAT OUTBD PWR

S 863-023

- (7) Remove the DO-NOT-CLOSE tags and locks and close these circuit breakers on the P11 panel:
(a) 11H23, SLAT ALTN CONT INBD
(b) 11H24, SLAT ALTN CONT OUTBD

EFFECTIVITY

ALL

12-21-08

09

Page 310
Aug 22/08

S 863-033

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

CAUTION: MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

(8) Pressurize the center hydraulic system (AMM 29-11-00/201).

S 863-030

(9) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 213-031

(10) Move the flap control lever to the zero-unit detent and make sure the TE flaps and LE slats move to the fully retracted position.

S 443-027

(11) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

EFFECTIVITY

ALL

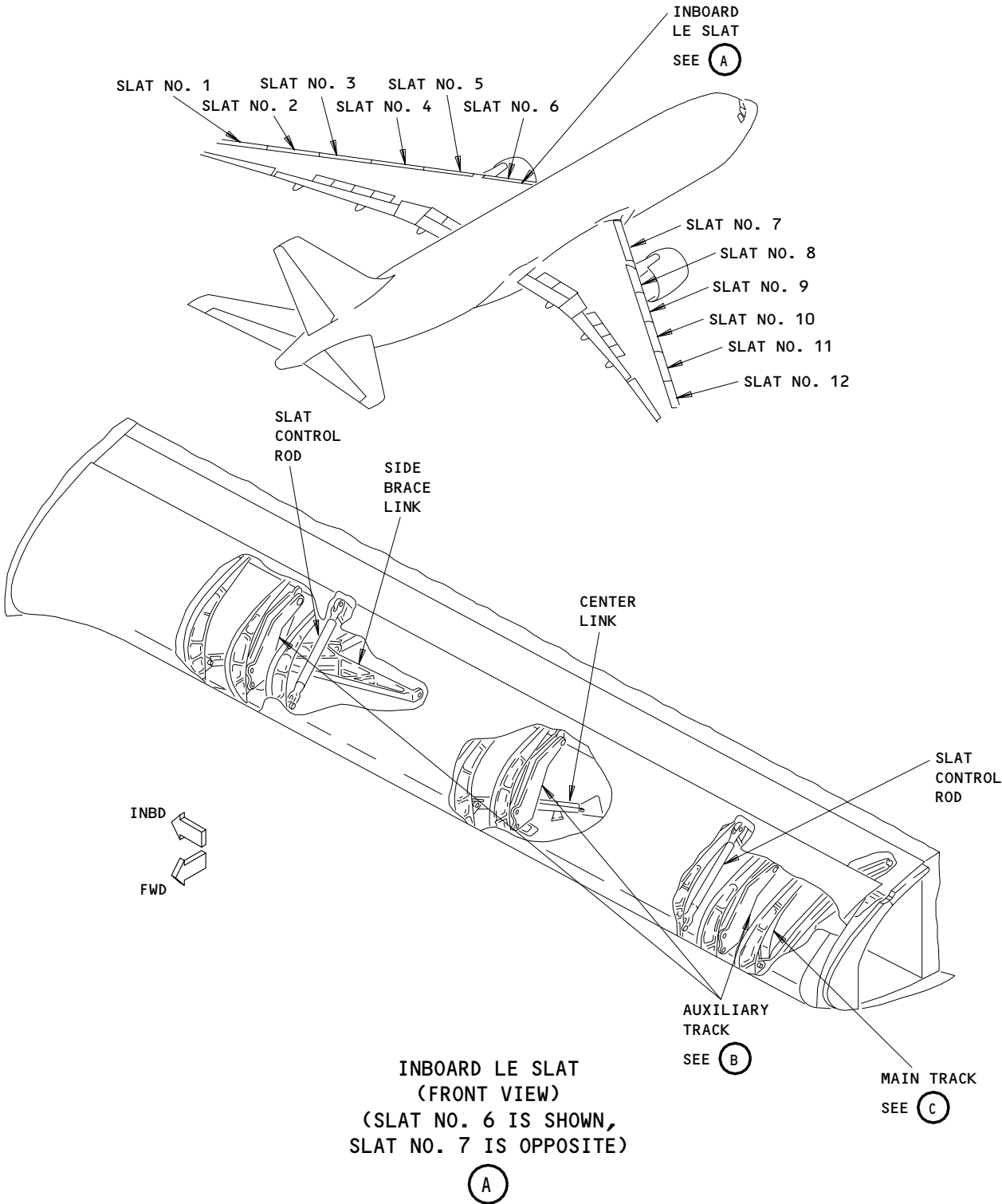
12-21-08

05

Page 311
Aug 22/08

BOEING

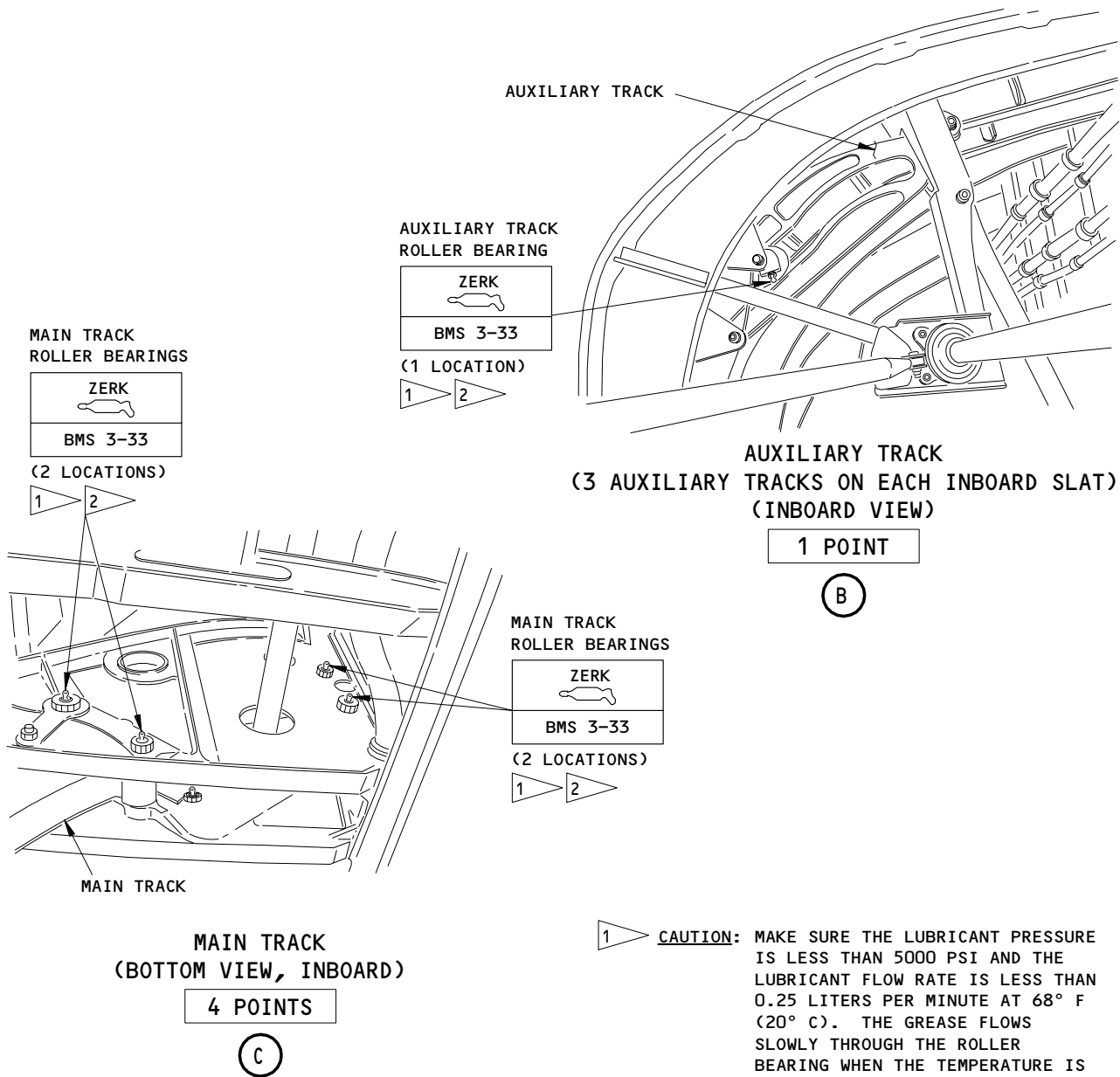
767 MAINTENANCE MANUAL



Lubrication for the Inboard LE Slat
Figure 301 (Sheet 1)

EFFECTIVITY	
ALL	

12-21-08

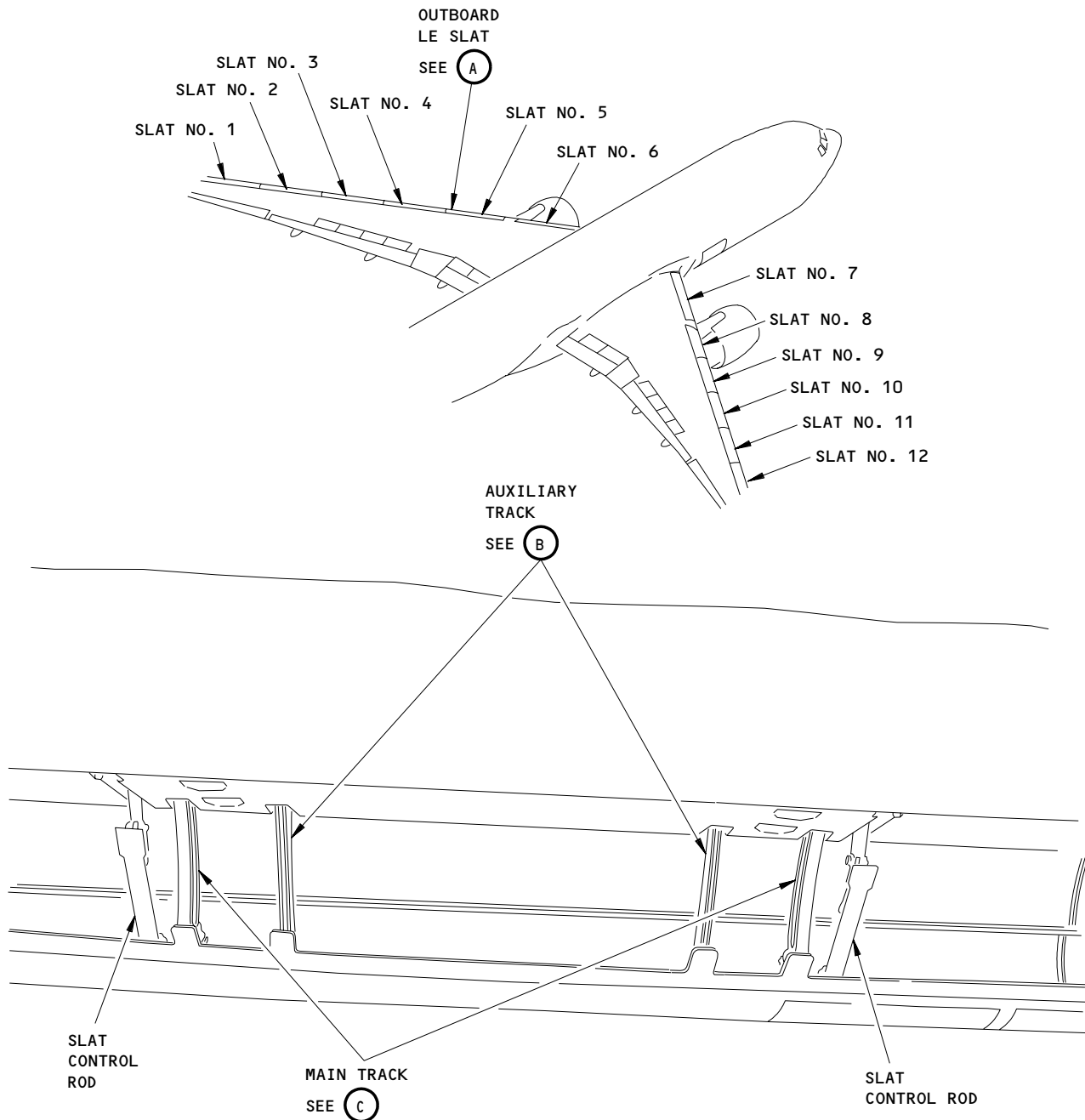


NOTE: WHEN YOU WASH THE AREA WITH PRESSURIZED WATER, SOME GREASE USUALLY WASHES OUT OF THE ROLLER BEARINGS. KEEP SUFFICIENT GREASE IN THE ROLLER BEARINGS AT ALL TIMES.

Lubrication for the Inboard LE Slat
Figure 301 (Sheet 2)

EFFECTIVITY
ALL

12-21-08



OUTBOARD LE SLAT
(AFT VIEW, SLAT EXTENDED)
(NO. 5 SLAT IS SHOWN)
(EXAMPLE, OUTBOARD SLATS NO. 1-5 LEFT WING AND NO. 8-12 RIGHT WING)

(A)

Lubrication for the Outboard LE Slat
Figure 302 (Sheet 1)

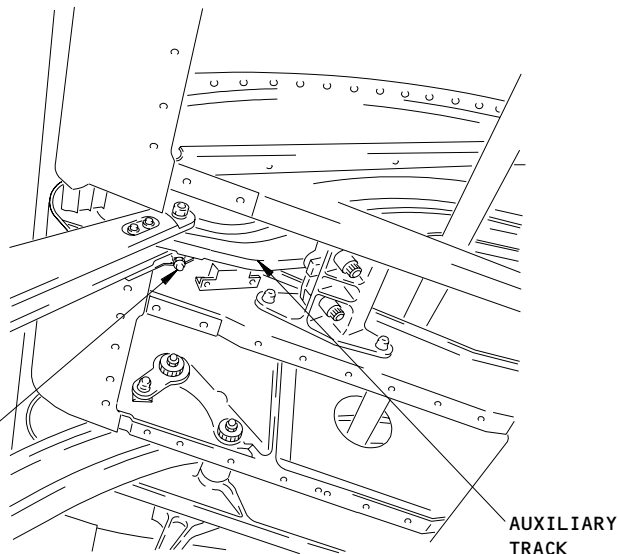
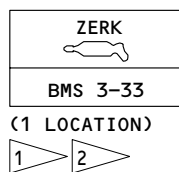
EFFECTIVITY	
	ALL

12-21-08

NOTE: WHEN YOU WASH THE AREA WITH PRESSURIZED WATER, SOME GREASE USUALLY WASHES OUT OF THE ROLLER BEARINGS. KEEP SUFFICIENT GREASE IN THE ROLLER BEARINGS AT ALL TIMES.

1 CAUTION: MAKE SURE THE LUBRICANT PRESSURE IS LESS THAN 5000 PSI AND THE LUBRICANT FLOW RATE IS LESS THAN 0.25 LITERS PER MINUTE AT 68° F (20° C). THE GREASE FLOWS SLOWLY THROUGH THE ROLLER BEARING WHEN THE TEMPERATURE IS LOW. TOO MUCH PRESSURE OR TOO HIGH A FLOW RATE CAN BREAK THE SEALS. BEARINGS WITH SEALS BLOWN OUT MUST BE LUBRICATED TWICE AS OFTEN AS BEARINGS WITH SEALS INTACT.

AUXILIARY TRACK ROLLER BEARINGS

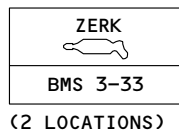


**AUXILIARY TRACK
(TWO AUXILIARY TRACKS ON EACH OUTBOARD SLAT)
(BOTTOM VIEW)**

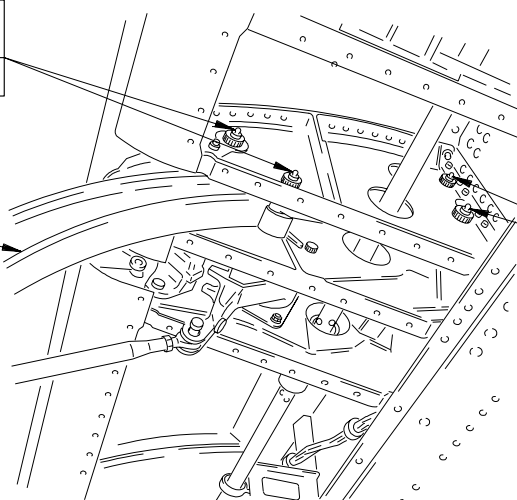
1 POINT

(B)

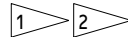
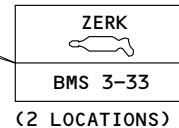
MAIN TRACK ROLLER BEARINGS



MAIN TRACK



MAIN TRACK ROLLER BEARINGS



INBD



NOTE: THE HEAD OF THE BOLT IS NOT ALWAYS ON THE INBOARD SIDE.

**MAIN TRACK
(TWO MAIN TRACKS ON EACH OUTBOARD SLAT)
(BOTTOM VIEW)**

4 POINTS

(C)

2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

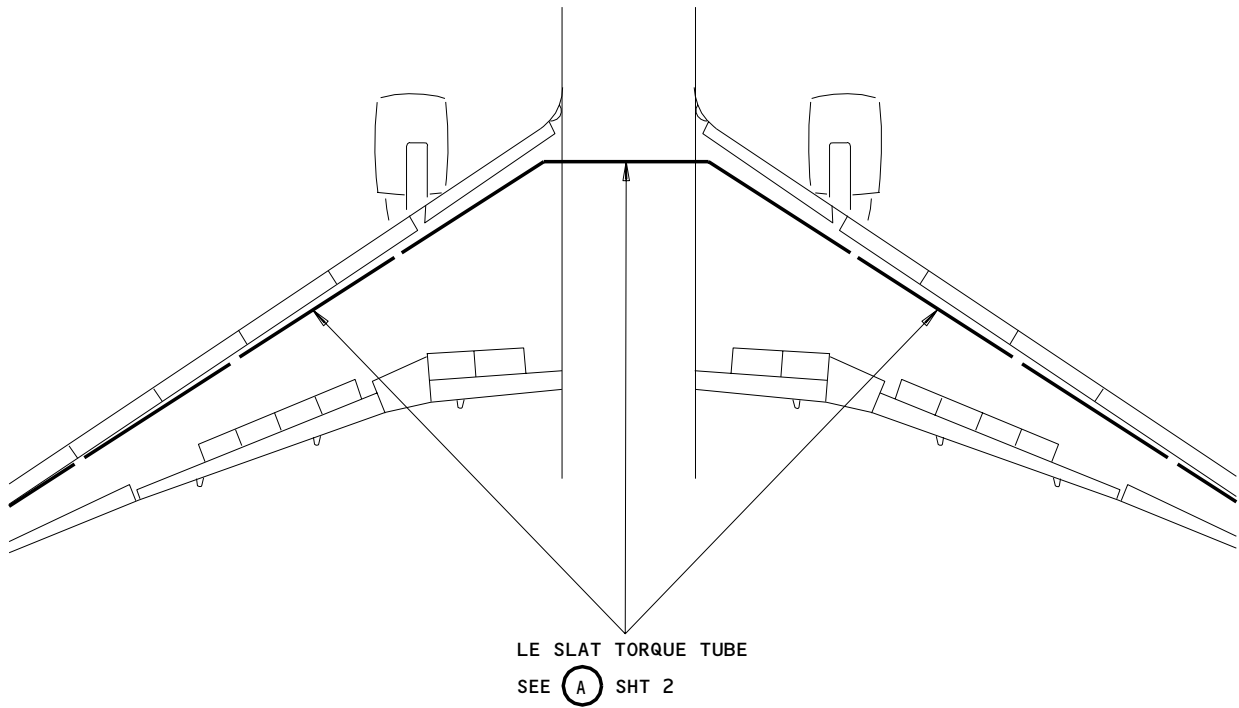
Lubrication for the Outboard LE Slat
Figure 302 (Sheet 2)

EFFECTIVITY	
	ALL

12-21-08

03

Page 315
Dec 22/05



Lubrication for the LE Slat Torque Tube
Figure 303 (Sheet 1)

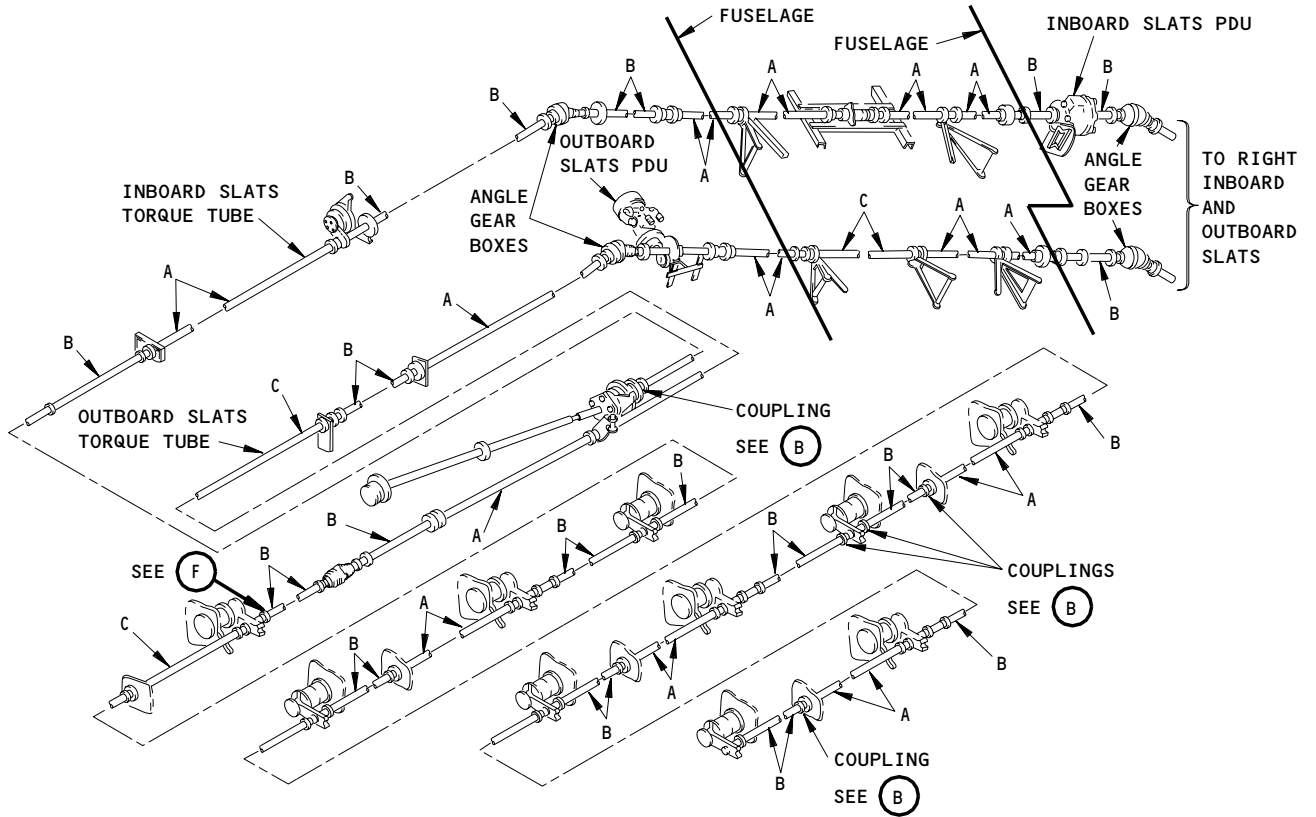
EFFECTIVITY	
	ALL

12-21-08

01

Page 316
Dec 22/05

L96834



**LE SLAT TORQUE TUBES
(LEFT WING AND FUSELAGE ARE SHOWN,
RIGHT WING IS OPPOSITE)**

(A)

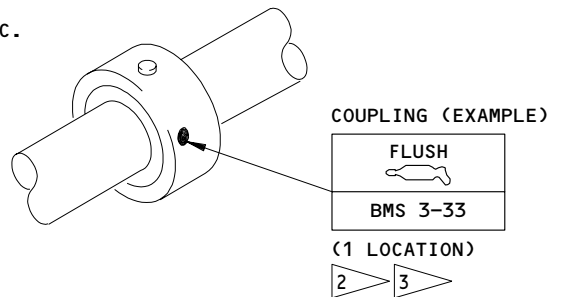
- 1 TYPE OF TORQUE TUBE IS CALLED OUT BY LETTERS A, B, OR C.
- LUBRICATE TORQUE TUBE TYPE "A" (ONE COUPLING).
 - LUBRICATE TORQUE TUBE TYPE "B" (TWO COUPLINGS).
 - TORQUE TUBE TYPE "C" DOES NOT HAVE COUPLING TO BE GREASED.

BETWEEN THE FOUR ANGLE GEAR BOXES:
THERE ARE NINETEEN COUPLINGS (SEVEN TYPE "A"
AND SIX TYPE "B" TORQUE TUBES).

AT EACH WING:
THERE ARE THIRTY FIVE COUPLINGS (SEVEN TYPE "A"
AND FOURTEEN TYPE "B" TORQUE TUBES).

- 2 CLEAN OFF ALL OF THE GREASE FROM THE EXTERNAL SIDE OF THE COUPLING.
- 3 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

(89 COUPLINGS TOTAL FOR THE SLAT DRIVE SYSTEM 1)



**COUPLING
(EXAMPLE)**

1 POINT

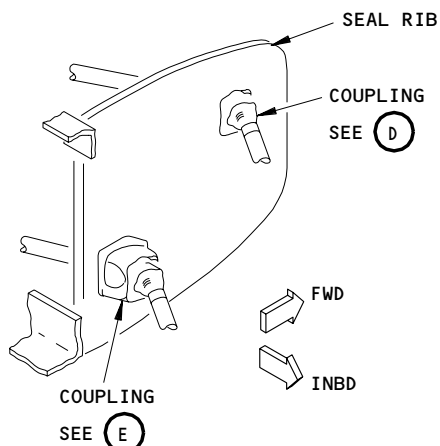
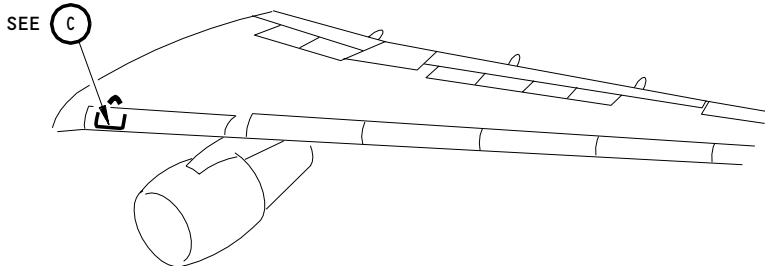
(B)

**Lubrication for the LE Slat Torque Tube
Figure 303 (Sheet 2)**

EFFECTIVITY	ALL
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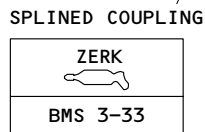
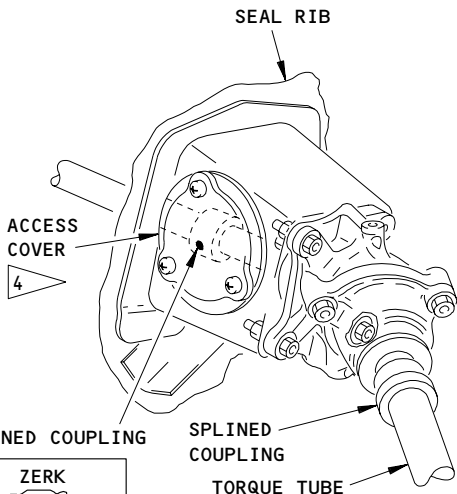
12-21-08

GEARBOX LOCATION

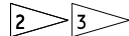


GEARBOX LOCATION
(LEFT WING IS SHOWN, RIGHT WING IS OPPOSITE)

(C)



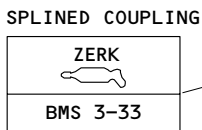
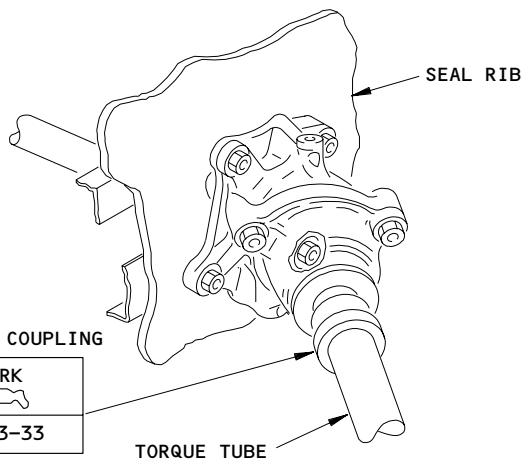
(1 LOCATION)



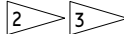
COUPLING
(ON BOTH SIDES OF SEAL RIB ON EACH WING)
(EXAMPLE)

1 POINT

(D)



(1 LOCATION)



COUPLING
(ON BOTH SIDES OF SEAL RIB ON EACH WING)
(EXAMPLE)

1 POINT

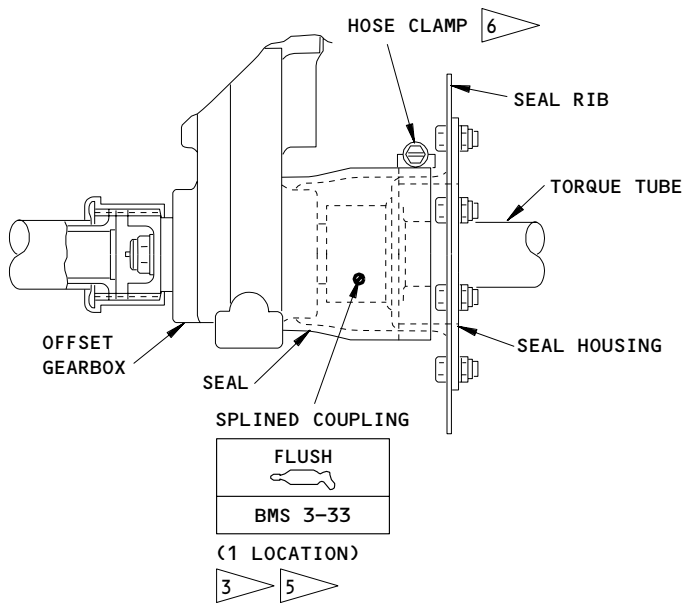
(E)

4 OPEN ACCESS COVER TO LUBE
SPLINED COUPLING INSIDE.

Lubrication for the LE Slat Torque Tube
Figure 303 (Sheet 3)

EFFECTIVITY	ALL
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12-21-08



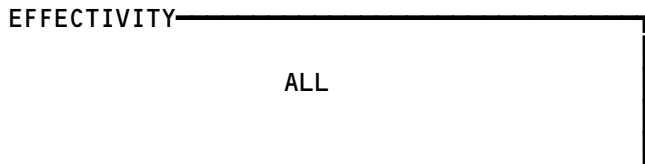
COUPLING
(BETWEEN OFFSET GEARBOX AND SEAL RIB AT SLATS 5 AND 8)

1 POINT

F

- 5 REMOVE SEAL TO LUBRICATE COUPLING
- 6 TORQUE 15 TO 20 POUND-INCHES (1.7 TO 2.2 NEWTON-METERS)

Lubrication for the LE Slat Torque Tube
Figure 303 (Sheet 4)



12-21-08

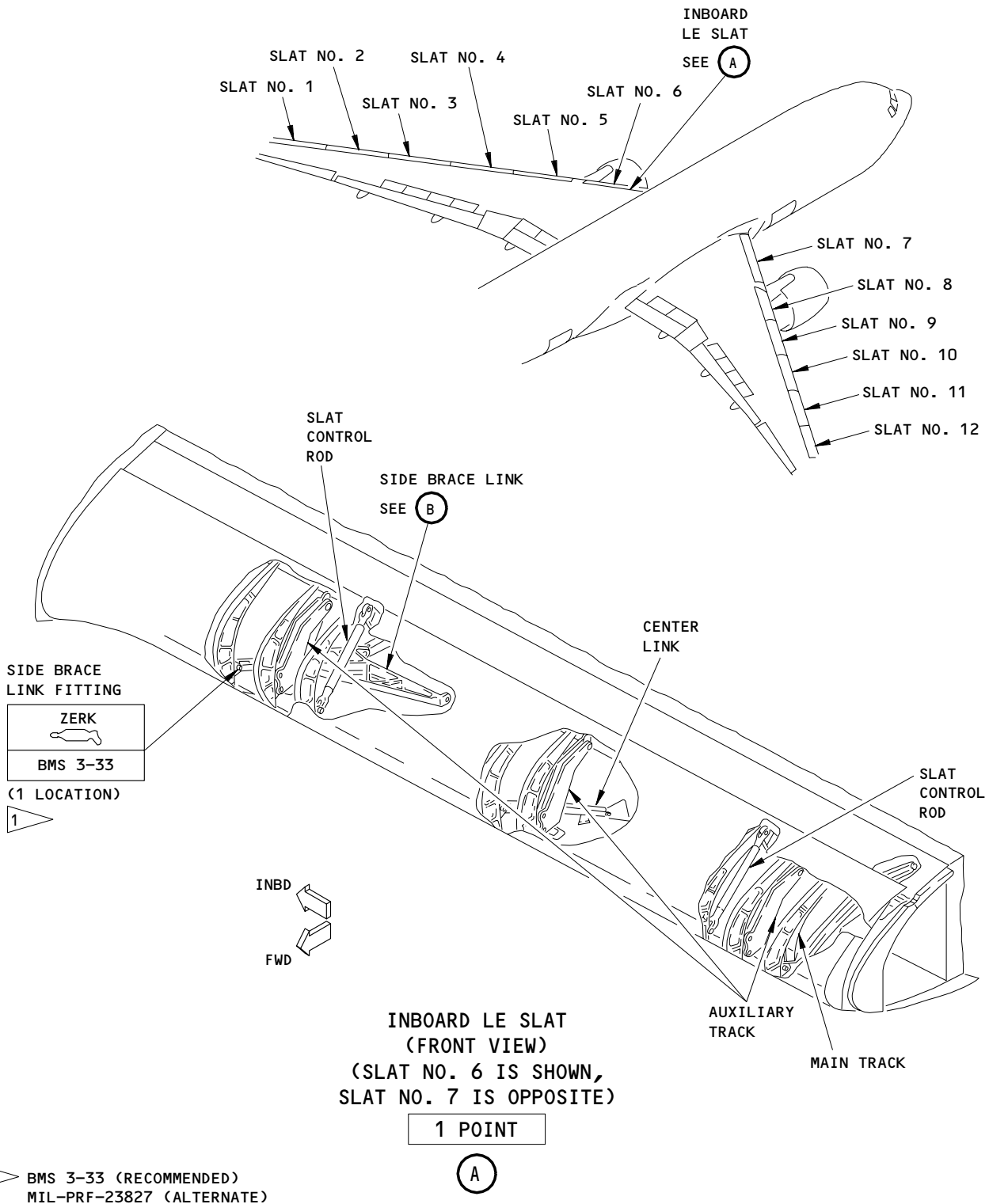
02

Page 319
Dec 22/07

MD7690

BOEING

767 MAINTENANCE MANUAL



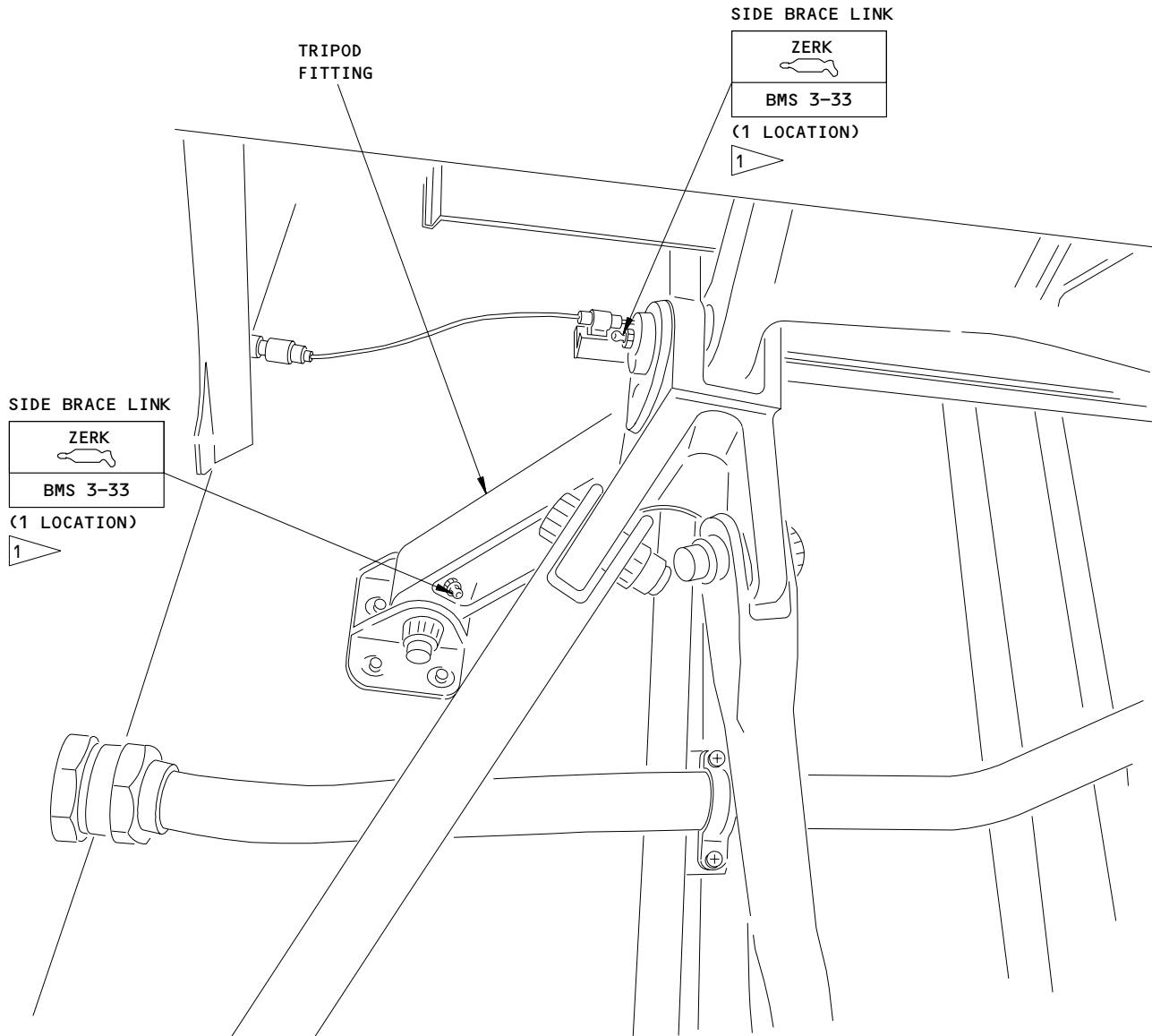
Lubrication for the Side Brace Link on the Inboard LE Slat
Figure 304 (Sheet 1)

EFFECTIVITY
ALL

12-21-08

01

Page 320
Dec 22/05



**SIDE BRACE LINK
(FRONT VIEW)
(SLAT NO. 6 IS SHOWN,
SLAT NO. 7 IS OPPOSITE)**

2 POINTS

(B)

1 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

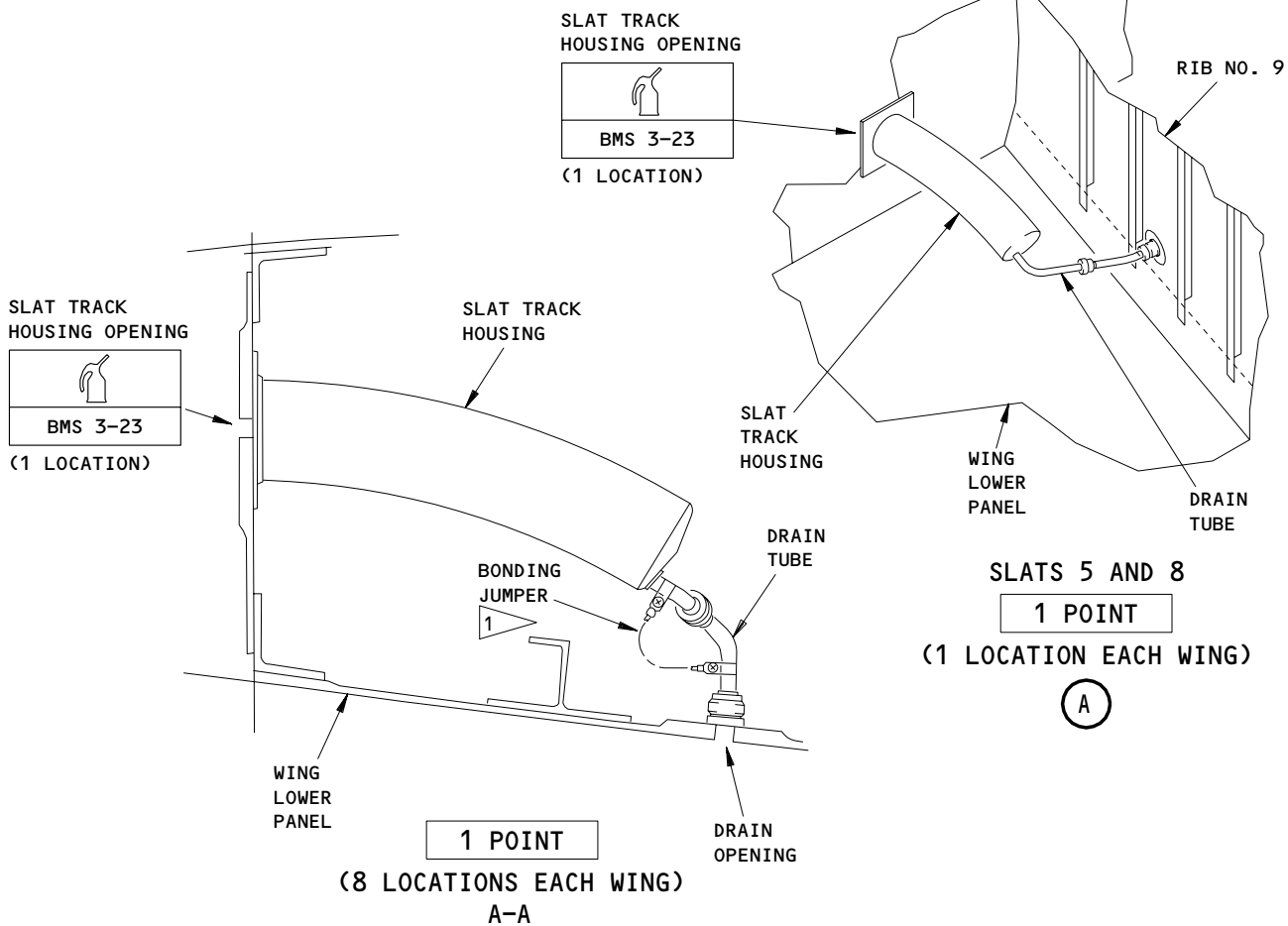
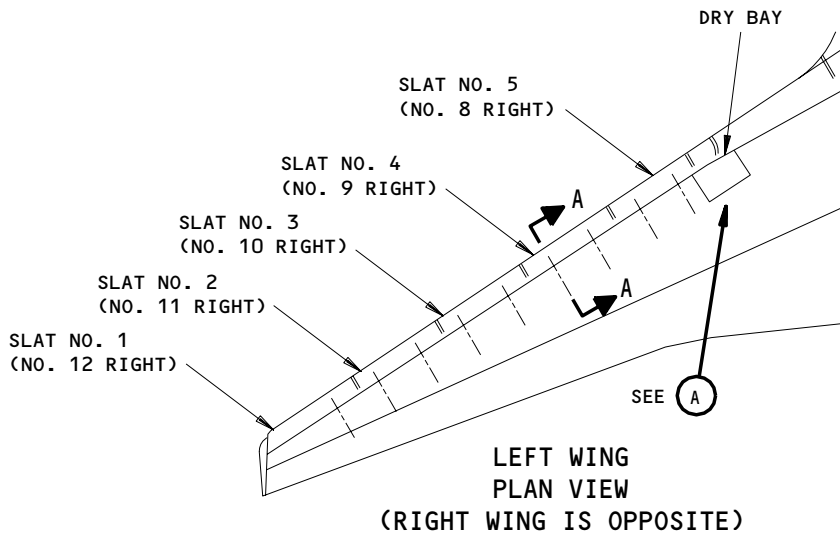
**Lubrication for the Side Brace Link on the Inboard LE Slat
Figure 304 (Sheet 2)**

EFFECTIVITY	ALL
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12-21-08

612678

BOEING
767
MAINTENANCE MANUAL



1 SB 57-0068 CHANGES JUMPER INSTALLATION FOR ELECTROSTATIC GROUNDING.

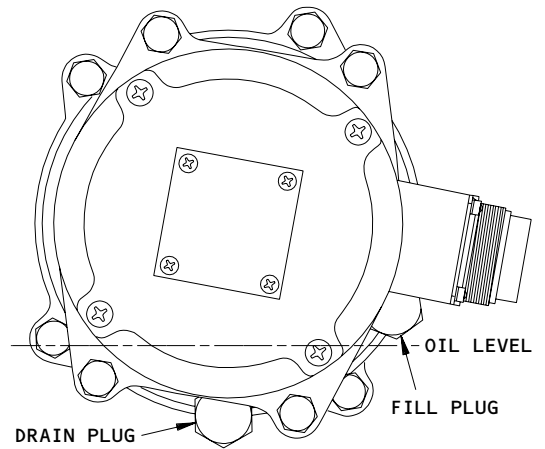
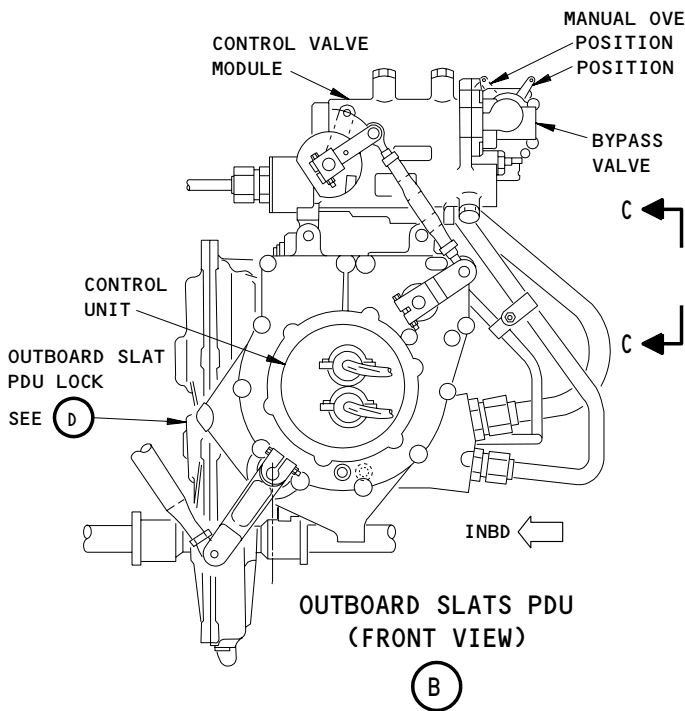
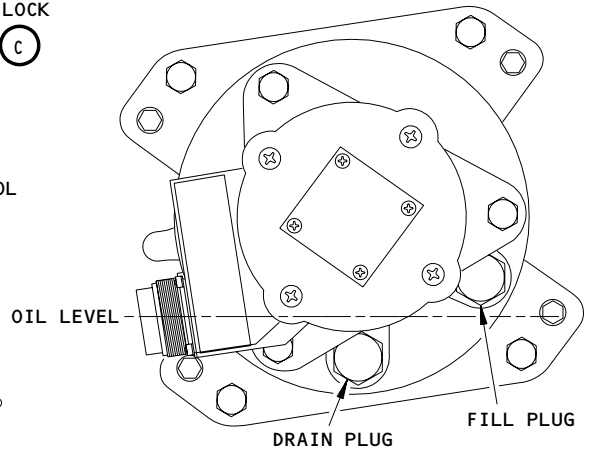
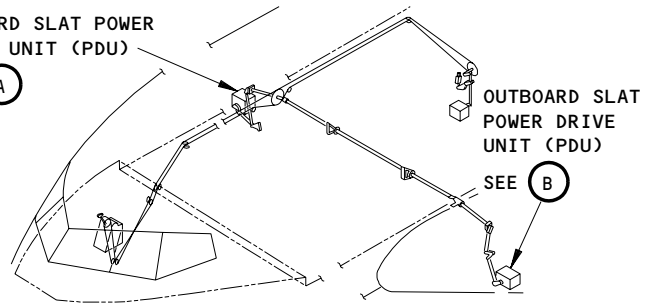
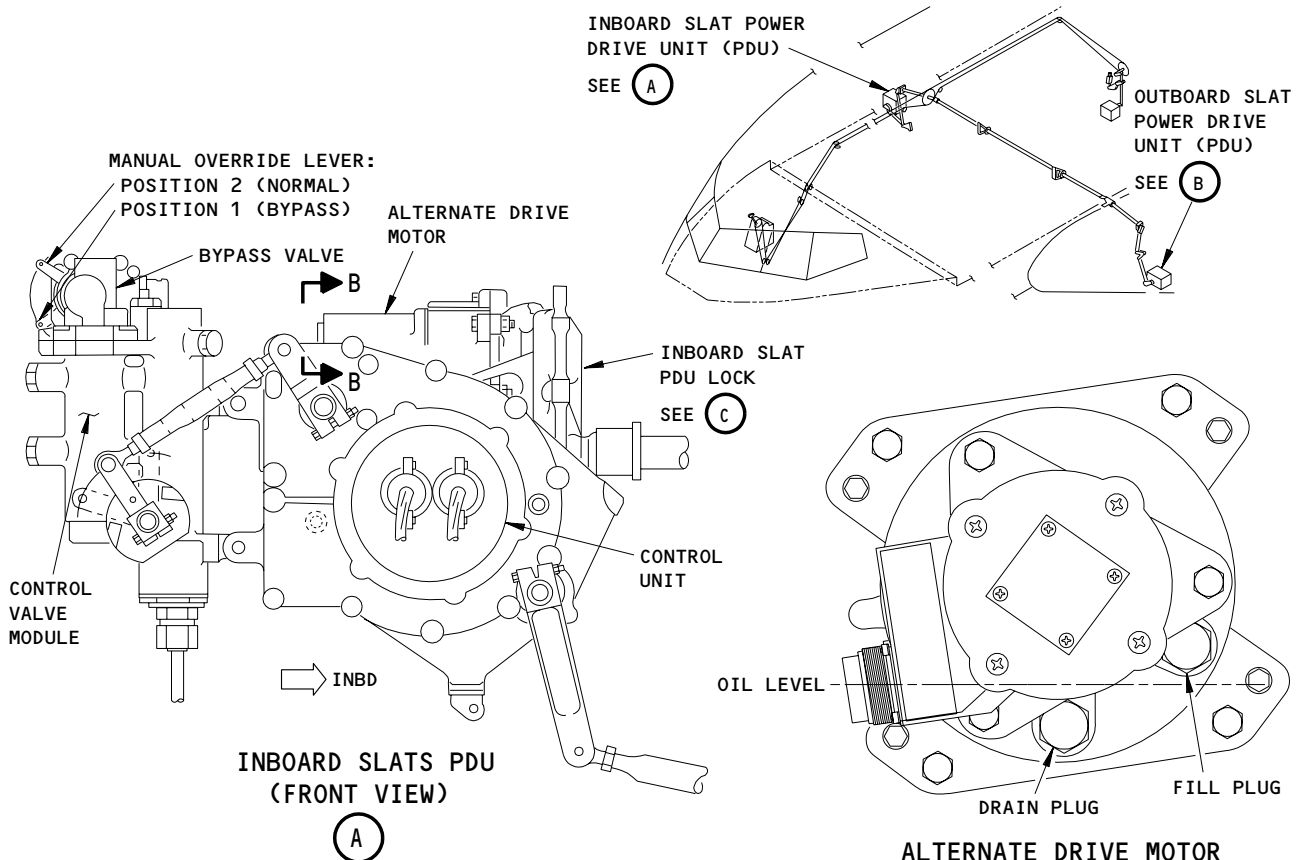
Servicing for the Outboard LE Slat Track Housing and Drain Tube
Figure 305

EFFECTIVITY	
ALL	

12-21-08

01

Page 322
Dec 22/05



**PDU Bypass Valve and PDU Ground Lock for the LE Slat
Figure 306 (Sheet 1)**

EFFECTIVITY

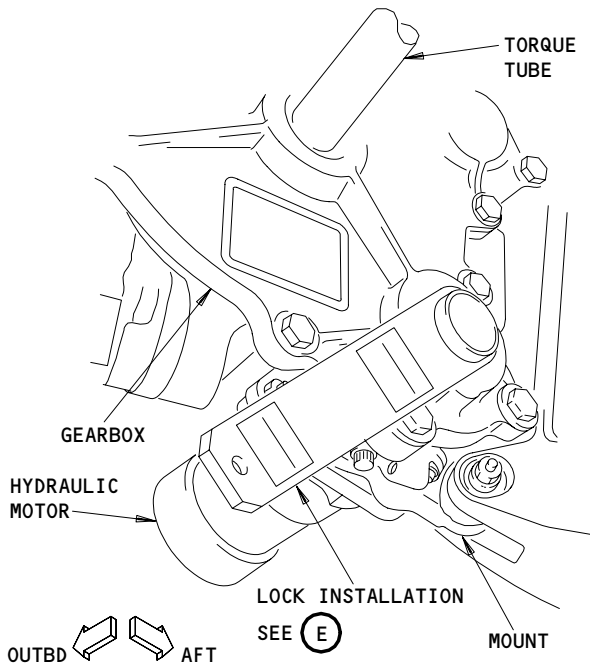
ALL

12-21-08

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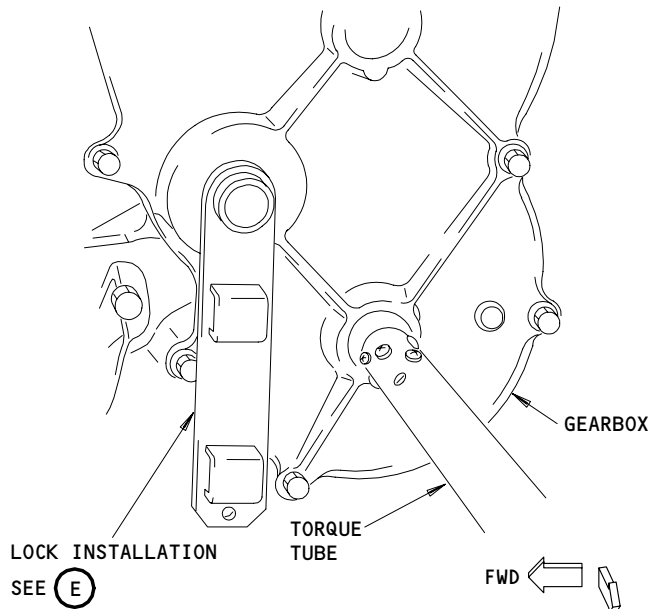
Page 323
Dec 22/05

612698



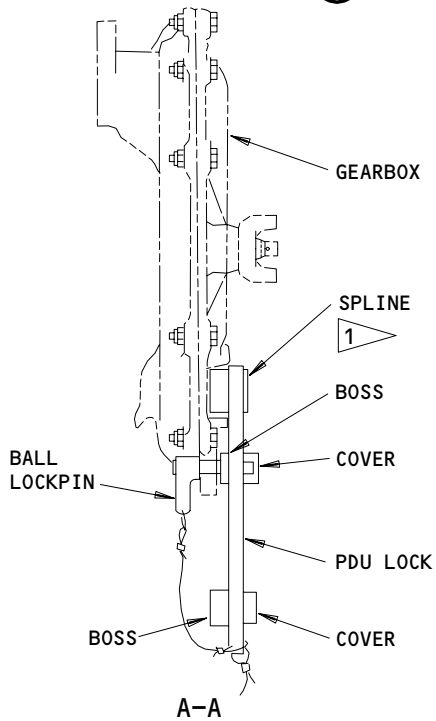
INBOARD SLAT PDU LOCK

(C)

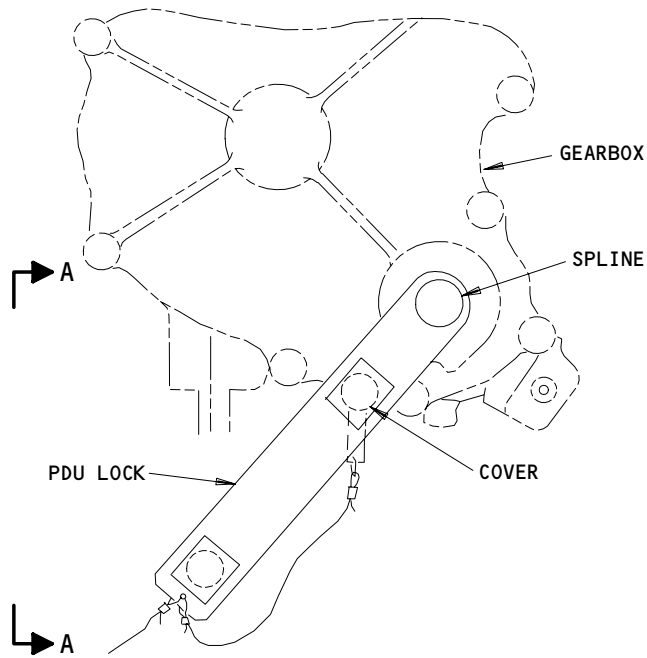


OUTBOARD SLAT PDU LOCK

(D)



A-A



LOCK INSTALLATION (EXAMPLE)

(E)

1 THE SPLINE IS INSTALLED INTO THE GEARBOX AND IS HELD IN POSITION BY A BALL LOCKPIN THROUGH THE BOSS AND THE GEARBOX

PDU Bypass Valve and PDU Ground Lock for the LE Slat
Figure 306 (Sheet 2)

EFFECTIVITY

ALL

12-21-08

01

Page 324
Dec 22/05

TRAILING EDGE FLAP SYSTEM – SERVICING (LUBRICATION)

1. General

- A. This procedure gives instructions to lubricate the trailing edge (TE) flap system.
- B. This servicing task is divided into five areas:
 - the inboard flaps (Fig. 301)
 - the inboard aft flap (Fig. 302)
 - the outboard flap (Fig. 303)
 - the flap torque tube couplings (Fig. 304)
 - the offset tee gearbox (at the outboard actuator of the inboard flap) (Fig. 306).

Refer to the applicable figure(s) to lubricate each area as necessary for your maintenance.

TASK 12-21-09-603-001

2. Lubrication for the Trailing Edge Flap System

A. Equipment

- (1) TE Flap PDU Lock - A27009-7
- (2) Circuit Breaker Lockout Clip - 1012LC-4
Commercially Available

B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
- (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) D00014 Grease - MIL-G-21164 (Alternate)
- (4) C00259 Primer - BMS 10-11 Type 1
- (5) A00436 Sealant - BMS 5-45 (Supersedes BMS 5-26 Sealant)

C. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 27-51-00/201, Trailing Edge Flap System
- (3) AMM 29-11-00/201, Main (Left, Right and Center) Hydraulic Systems
- (4) AMM 32-00-15/201, Landing Gear Door Lock
- (5) AMM 32-00-20/201, Landing Gear Downlock

D. Access

- (1) Location Zones
 - 144 Right MLG Wheel Well
 - 211/212 Control Cabin
 - 555/655 Inboard Trailing Edge Flap
 - 566/666 Outboard Trailing Edge Flap
 - 730/740 Left/Right Main Landing Gear and Doors

E. Prepare for Servicing

EFFECTIVITY

ALL

12-21-09

02

Page 301
Aug 22/07

S 043-028

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO THE EQUIPMENT.

- (1) Do the deactivation procedure for the thrust reverser for ground maintenance (AMM 78-31-00/201).

S 213-023

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

CAUTION: MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (2) Make sure that the TE flaps and LE slats are in the fully extended position and that the flap control lever is in the 30-unit detent.

S 493-002

- (3) Install a DO-NOT-OPERATE tag on the flap control lever.

S 213-006

- (4) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 493-007

WARNING: USE THE PROCEDURE IN AMM AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (5) Open the landing gear doors and install the door locks (AMM 32-00-15/201).

S 863-008

- (6) Open these circuit breakers on the main power distribution panel, P6, and install locks and attach DO-NOT-CLOSE tags:
 - (a) 6D21, ALTN SLAT INBD PWR
 - (b) 6D24, ALTN FLAP PWR

EFFECTIVITY

ALL

12-21-09

02

Page 302
Apr 22/08

(c) 6F24, ALTN SLAT OUTBD PWR

S 863-009

- (7) Open these circuit breakers on the overhead panel, P11, and install locks and attach DO-NOT-CLOSE tags:
- (a) 11H23, SLAT ALTN CONT INBD
 - (b) 11H24, SLAT ALTN CONTROL OUTBD
 - (c) 11J24, FLAPS ALTN CONT

S 863-010

- (8) Remove the power from the center hydraulic system (AMM 29-11-00/201), if the center hydraulic system is pressurized.

S 863-011

- (9) Move the manual override lever on the bypass valve of the TE flap PDU to the No. 1 (bypass) position (Fig. 305).

S 493-003

- (10) Install a DO-NOT-OPERATE tag on the manual override lever.

S 493-012

- (11) Install the PDU lock in the TE flap PDU (Fig. 305).

F. Procedures

S 643-013

- (1) Lubricate the applicable area(s) in the TE flap system.

G. Put the Airplane Back to Its Usual Condition

S 093-004

- (1) Remove the DO-NOT-OPERATE tag from the flap control lever.

S 863-018

- (2) Remove the DO-NOT-CLOSE tags and locks and close these circuit breakers on the P6 panel:
- (a) 6D21, ALTN SLAT INBD PWR
 - (b) 6D24, ALTN FLAP PWR
 - (c) 6F24, ALTN SLAT OUTBD PWR

S 863-019

- (3) Remove the DO-NOT-CLOSE tags and locks and close these circuit breakers on the P11 panel:
- (a) 11H23, SLAT ALTN CONT INBD
 - (b) 11H24, SLAT ALTN CONT OUTBD
 - (c) 11J24, FLAPS ALTN CONT

S 093-020

- (4) Remove the PDU lock from the TE flap PDU (Fig. 305).

EFFECTIVITY

ALL

12-21-09

02

Page 303
Apr 22/08

S 863-024

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE WHEEL WELLS WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. WHEN YOU MOVE THE FLAP CONTROL LEVER WITH THE HYDRAULIC SYSTEM PRESSURIZED, THE FLAPS AND FLAP DRIVE MECHANISMS WILL MOVE QUICKLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

CAUTION: MAKE SURE THE ACCESS DOOR FOR THE ENGINE STRUT, THE INBOARD FAN COWLING, AND THE THRUST REVERSER COWLING ARE CLEAR FROM THE MOVEMENT OF THE SLATS. IF THE MOVEMENT OF THE SLATS IS BLOCKED, IT CAN CAUSE DAMAGE TO THE AIRPLANE.

- (5) Remove the DO-NOT-OPERATE tag from the manual override lever on the PDU bypass valve and move the lever to the No. 2 (normal) position (Fig. 305).

S 213-017

- (6) Make sure that the TE flaps and the LE slats are in the fully retracted position, and that the flap control lever is in the zero detent.

S 023-022

WARNING: USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (7) Remove the door locks from the landing gear doors and close the doors (AMM 32-00-15/201).

S 863-029

- (8) Do the reactivation procedure for the thrust reverser for ground maintenance (AMM 78-31-00/201).

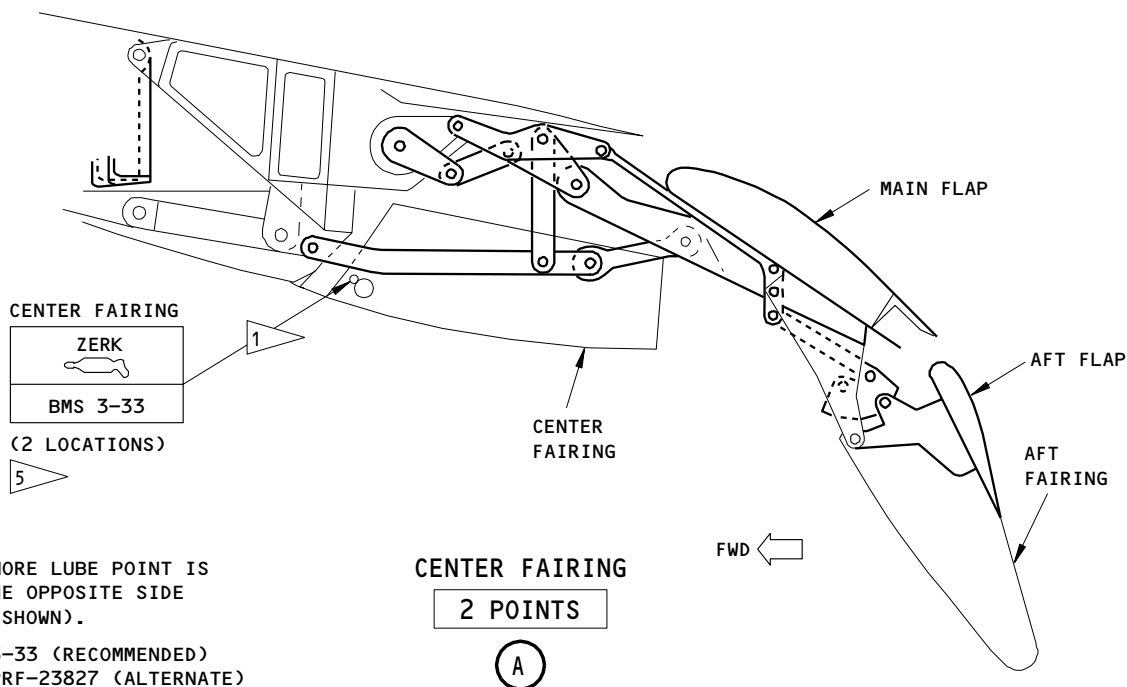
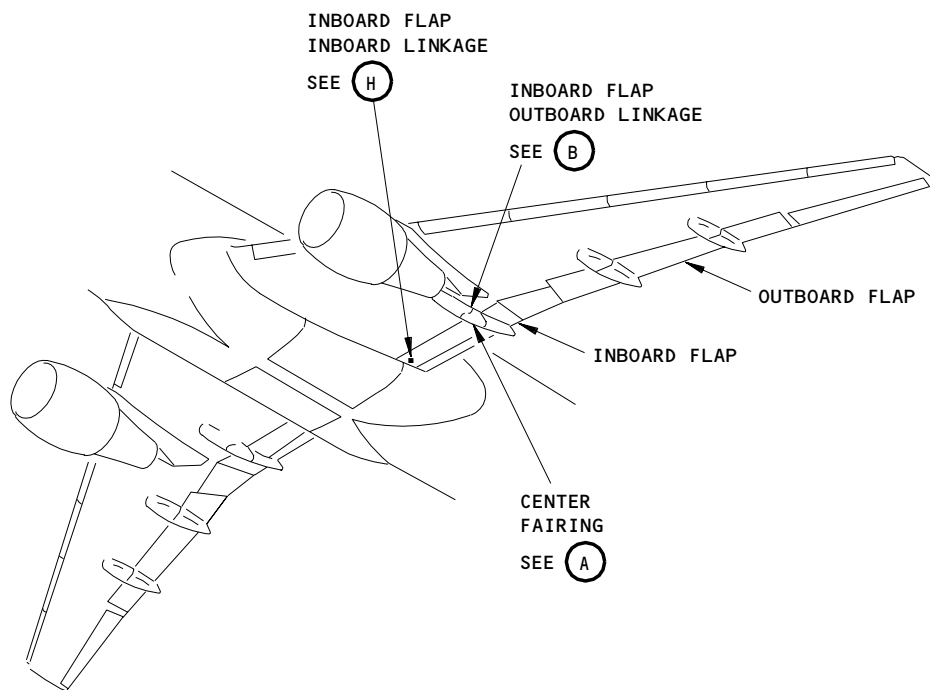
EFFECTIVITY

ALL

12-21-09

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Page 304
Aug 22/09



CENTER FAIRING
ZERK
BMS 3-33
(2 LOCATIONS)
5

- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN).
- 5 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

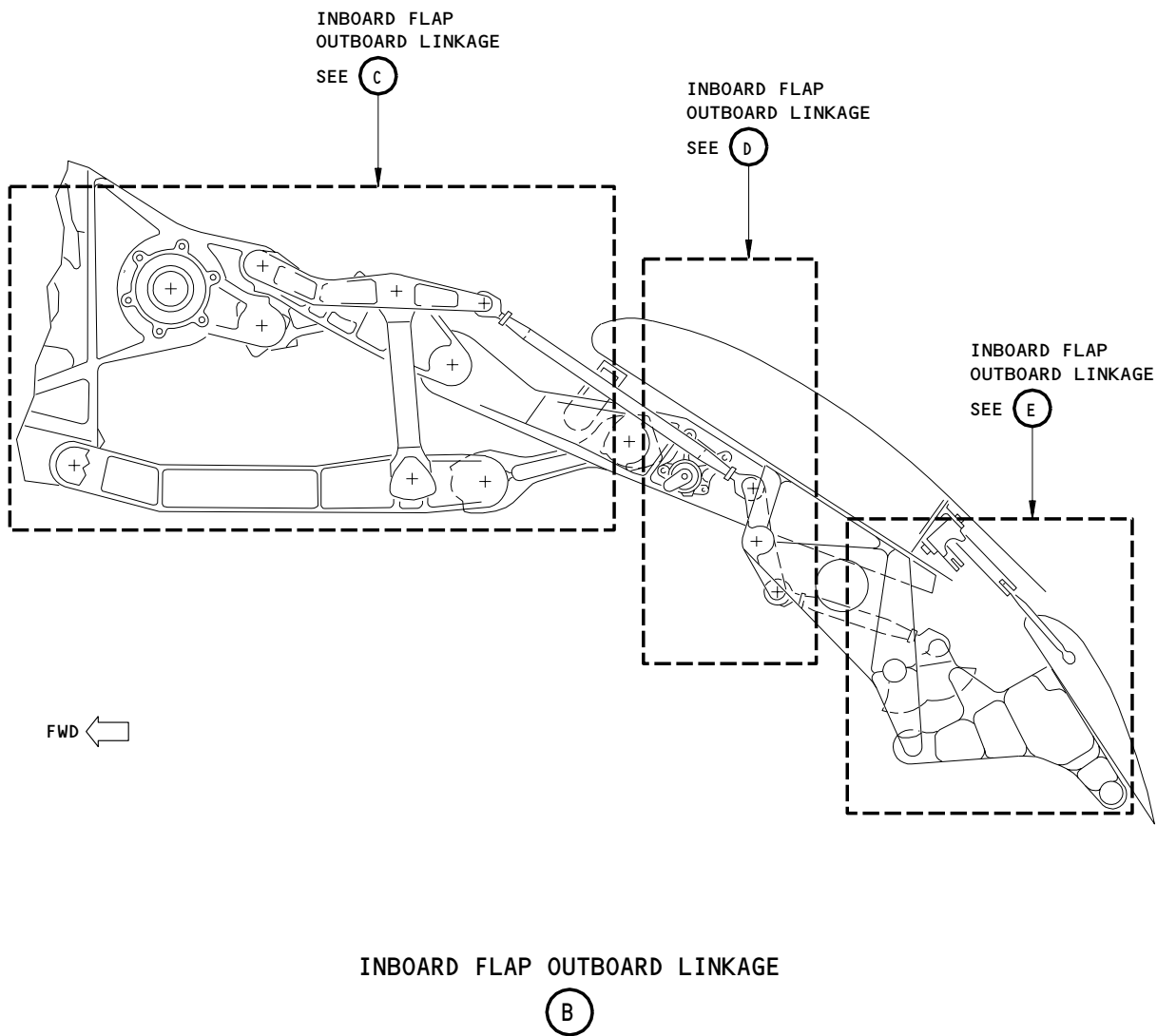
CENTER FAIRING
2 POINTS
A

Lubrication for the Inboard TE Flap
Figure 301 (Sheet 1)

EFFECTIVITY	ALL
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12-21-09

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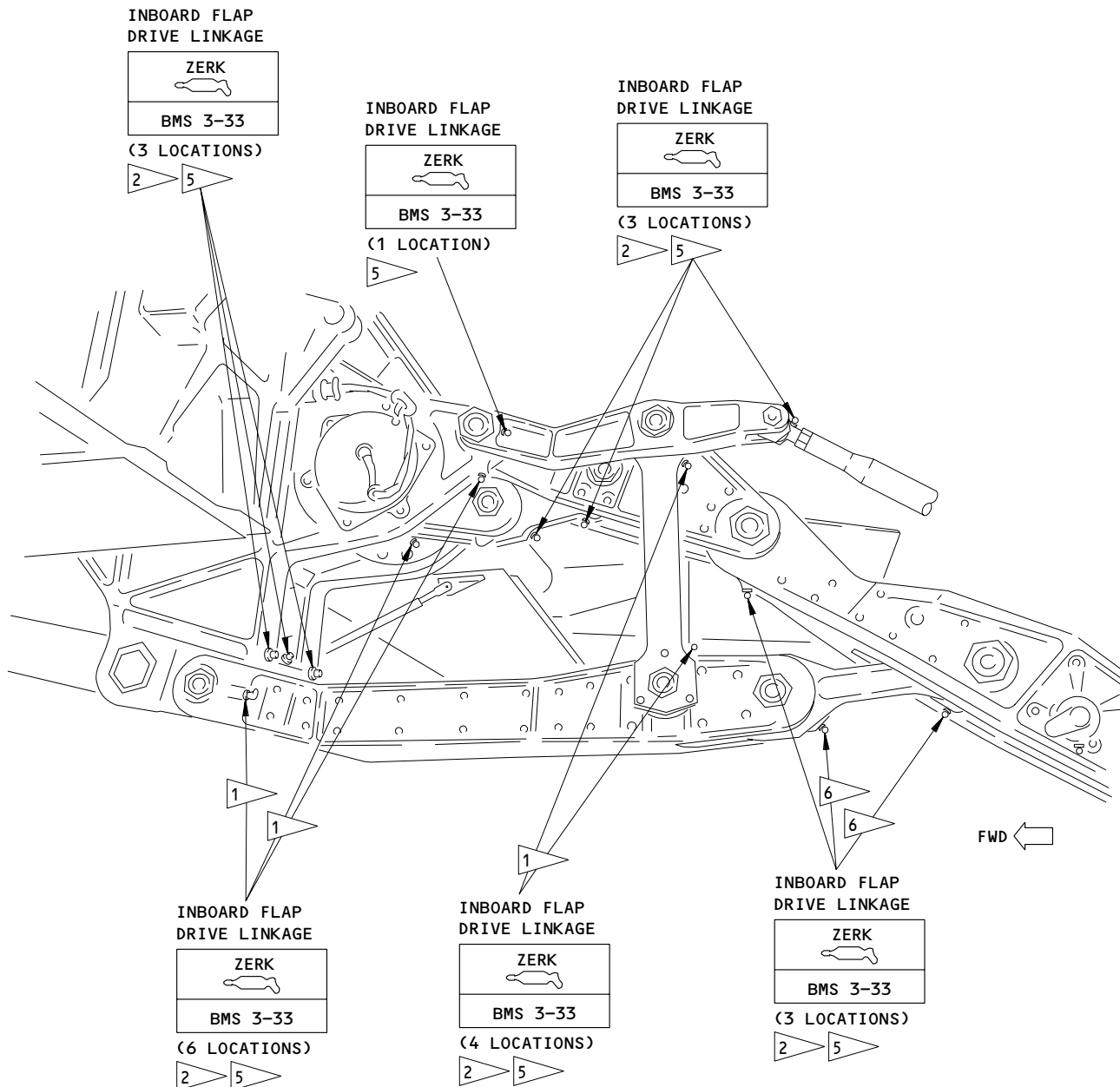
Lubrication for the Inboard TE Flap
Figure 301 (Sheet 2)

EFFECTIVITY	
	ALL

12-21-09

01

Page 306
Aug 22/99



- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN).
- 2 APPLY GREASE UNTIL YOU CAN SEE GREASE COME OUT AT THE EXIT.
- 5 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)
- 6 AIRPLANES POST-SB 27-196;
BMS 3-33 ONLY.

INBOARD FLAP OUTBOARD LINKAGE

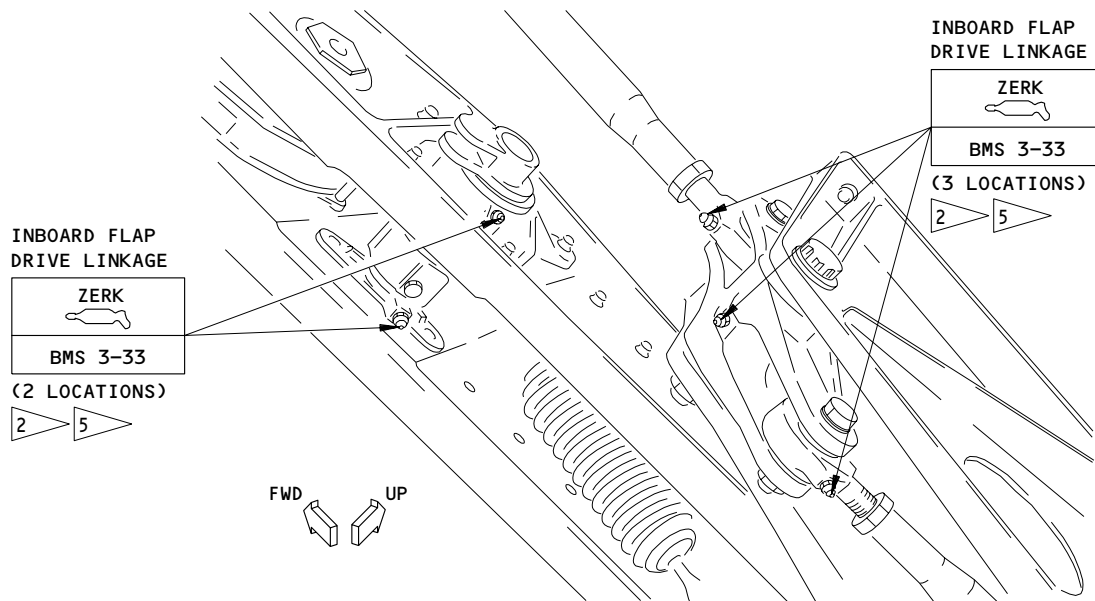
20 POINTS

(C)

Lubrication for the Inboard TE Flap
Figure 301 (Sheet 3)

EFFECTIVITY	ALL
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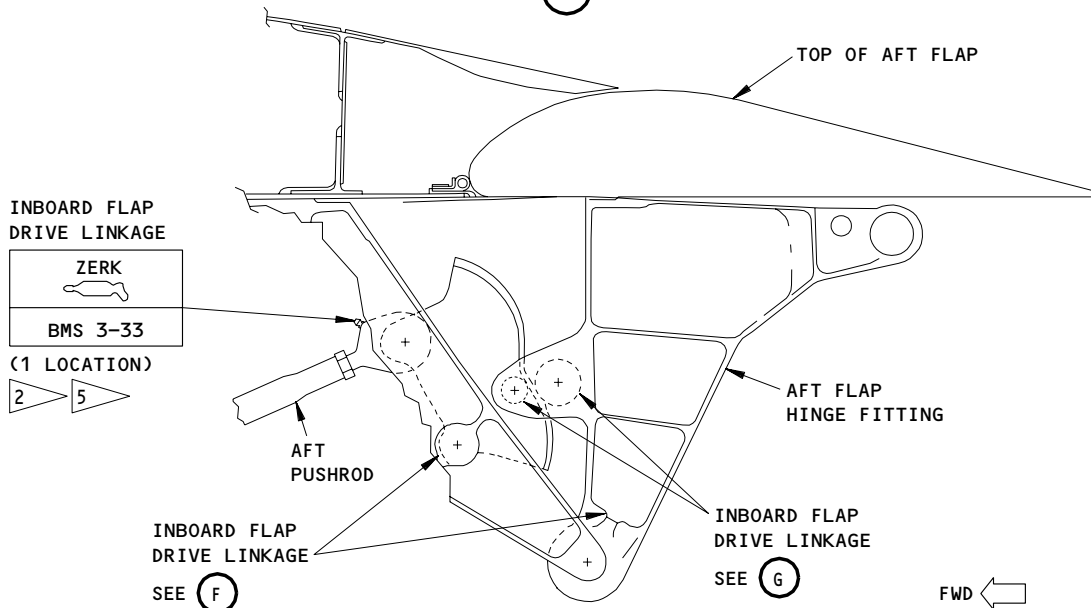
12-21-09



INBOARD FLAP OUTBOARD LINKAGE

5 POINTS

(D)



INBOARD FLAP OUTBOARD LINKAGE
(FLAP SHOWN RETRACTED)

1 POINT

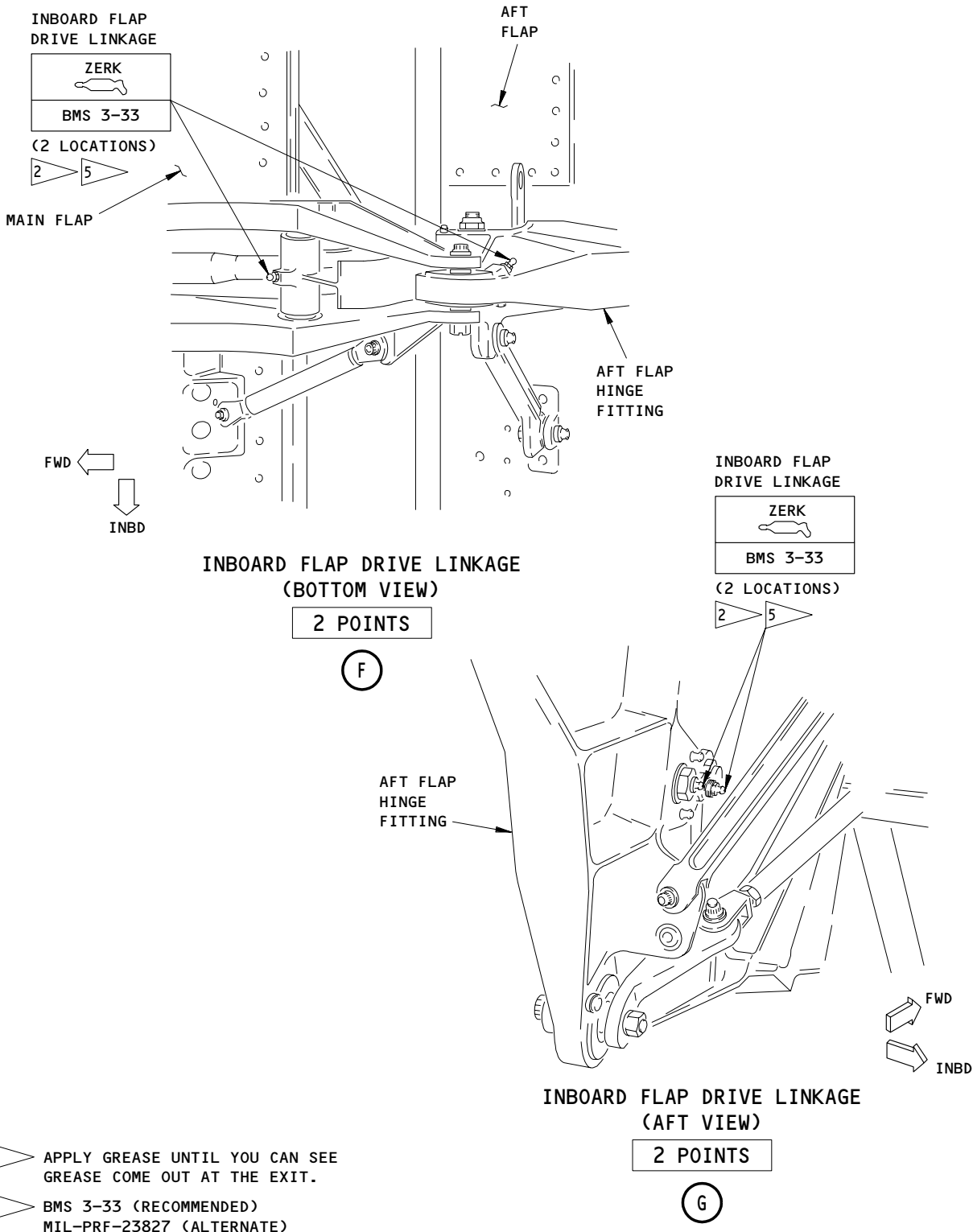
(E)

- 2 APPLY GREASE UNTIL YOU CAN SEE GREASE COME OUT AT THE EXIT.
- 5 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Lubrication for the Inboard TE Flap
Figure 301 (Sheet 4)

EFFECTIVITY	ALL
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12-21-09

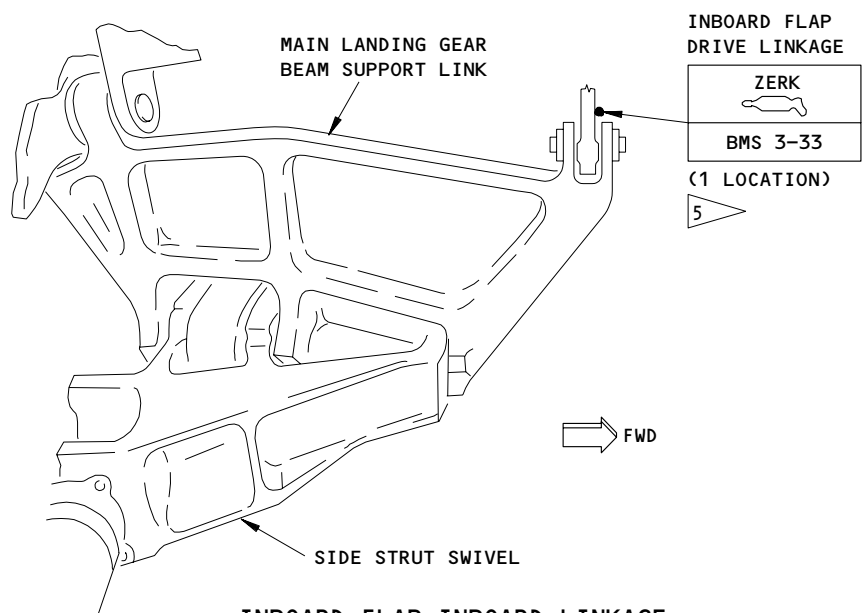
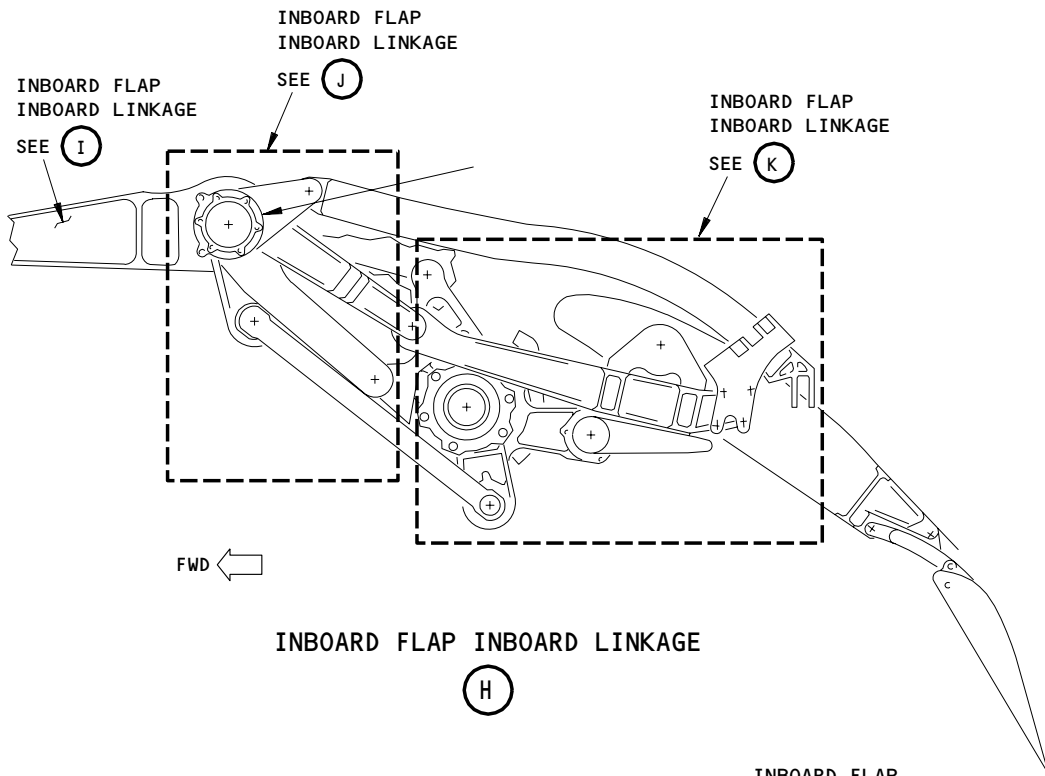


Lubrication for the Inboard TE Flap
Figure 301 (Sheet 5)

EFFECTIVITY	ALL

12-21-09

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767
MAINTENANCE MANUAL



INBOARD FLAP INBOARD LINKAGE
(VIEW IN THE OUTBOARD DIRECTION)

1 POINT

I

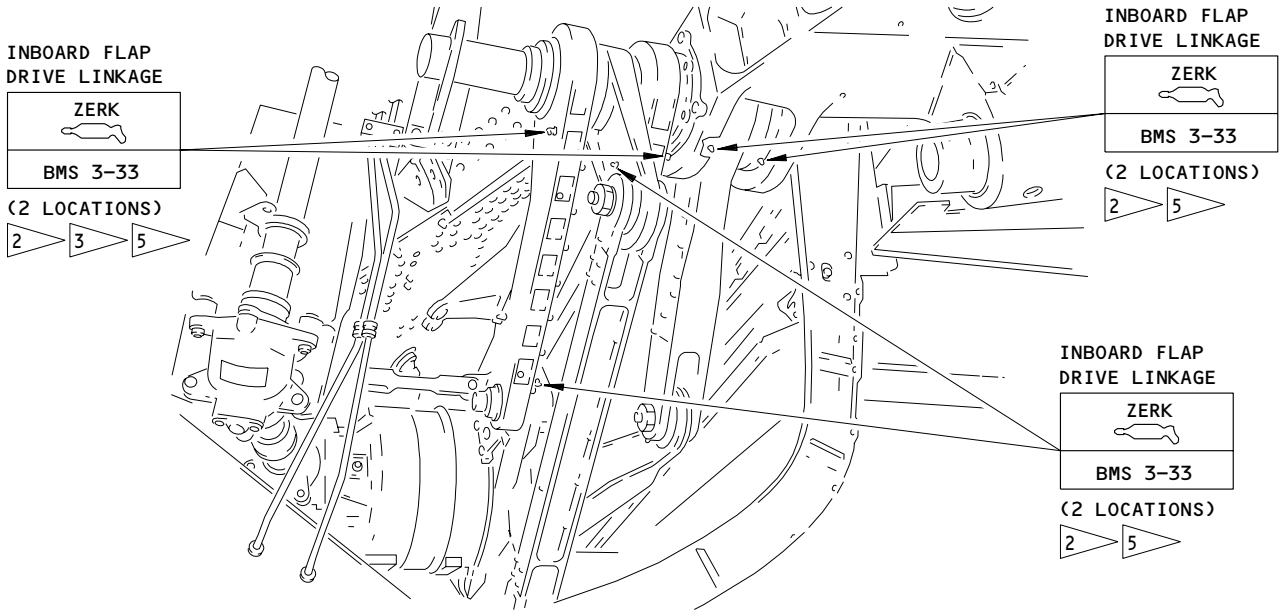
5 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Lubrication for the Inboard TE Flap
Figure 301 (Sheet 6)

EFFECTIVITY	
	ALL

12-21-09

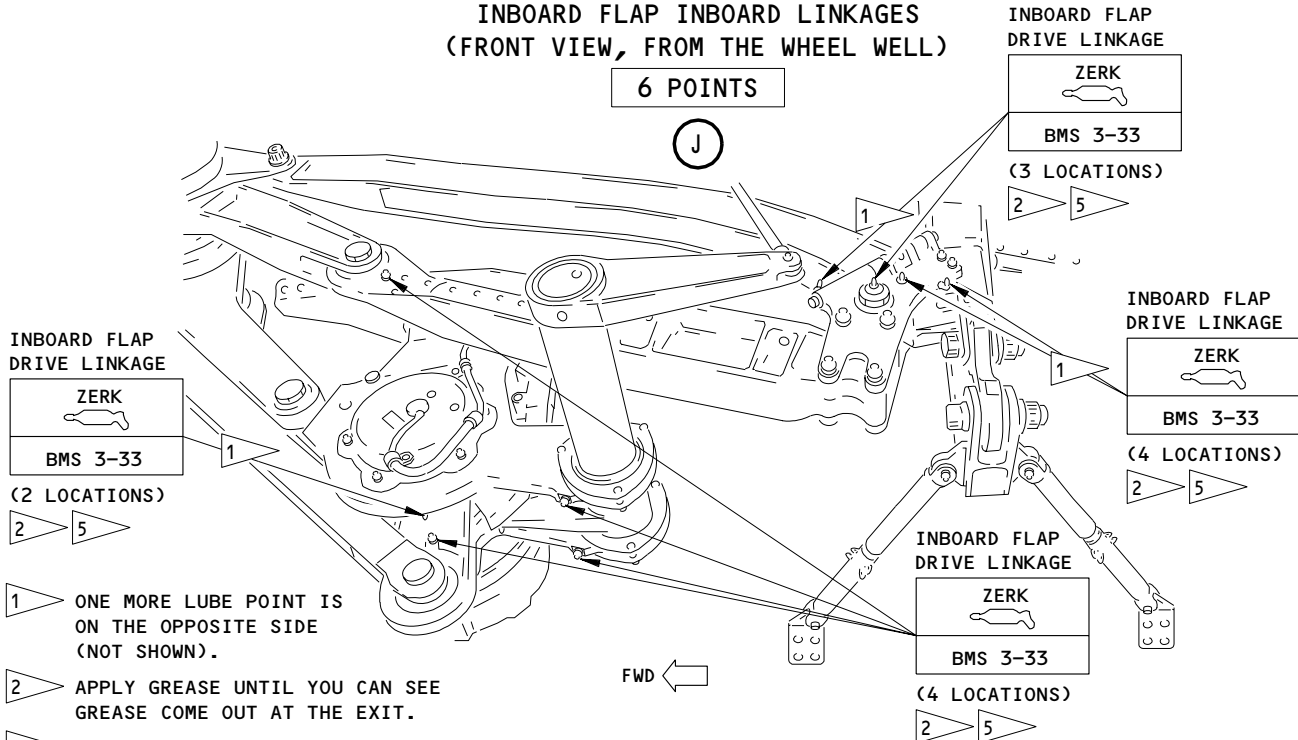
50802



INBOARD FLAP INBOARD LINKAGES (FRONT VIEW, FROM THE WHEEL WELL)

6 POINTS

(J)



- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN).
- 2 APPLY GREASE UNTIL YOU CAN SEE GREASE COME OUT AT THE EXIT.
- 3 LUBRICATE TO 5000 PSI ONLY, WITH BMS 3-33 IF SEPARATION OCCURS AT THE LINK SUPPORT HALVES OF THE BEARING HUB, REPAIR THE LINK SUPPORT (AMM 27-51-04/201).
- 5 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

INBOARD FLAP INBOARD LINKAGES

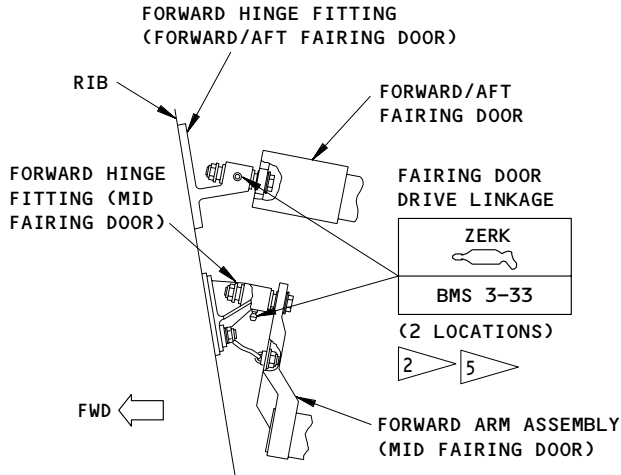
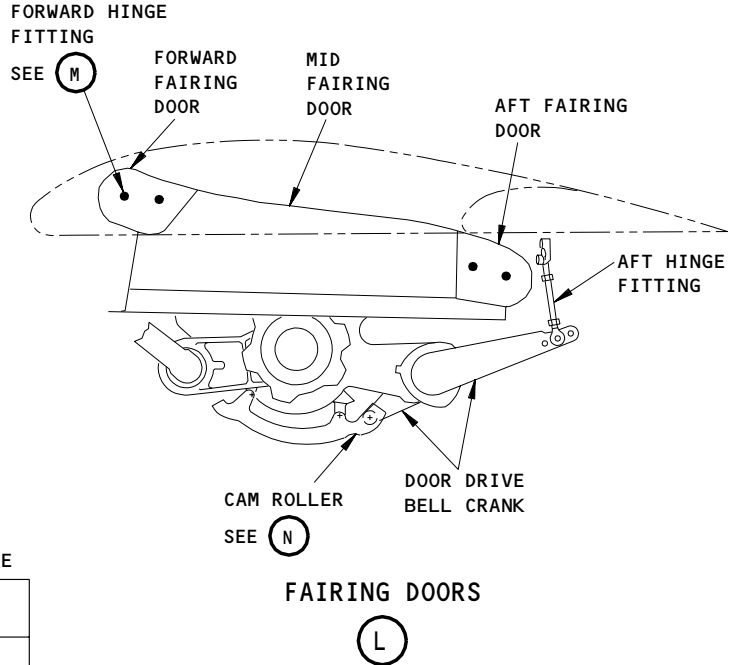
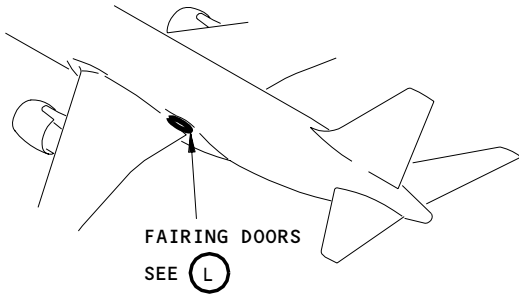
13 POINTS

(K)

Lubrication for the Inboard TE Flap
Figure 301 (Sheet 7)

EFFECTIVITY	ALL
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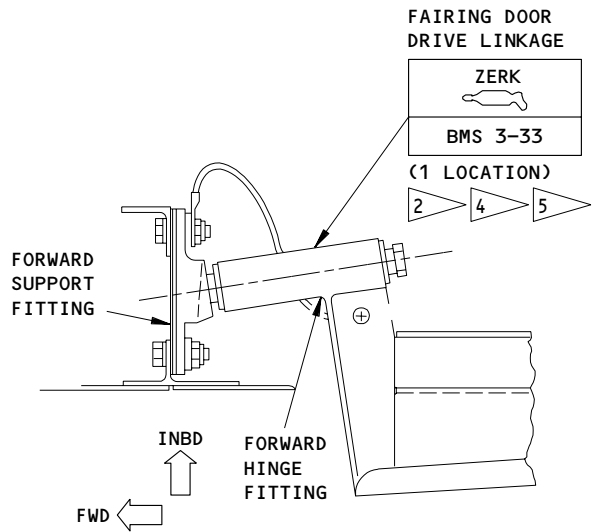
12-21-09



(AIRPLANES WITH TWO FORWARD HINGE FITTINGS)

2 POINTS

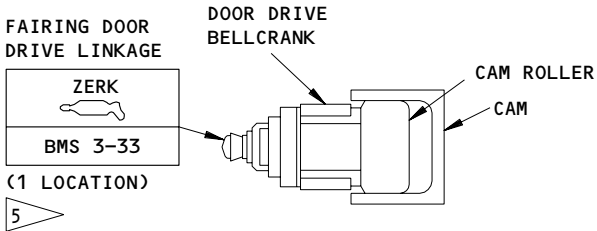
M



(AIRPLANES WITH ONE FORWARD HINGE FITTING)

1 POINT

M



1 POINT

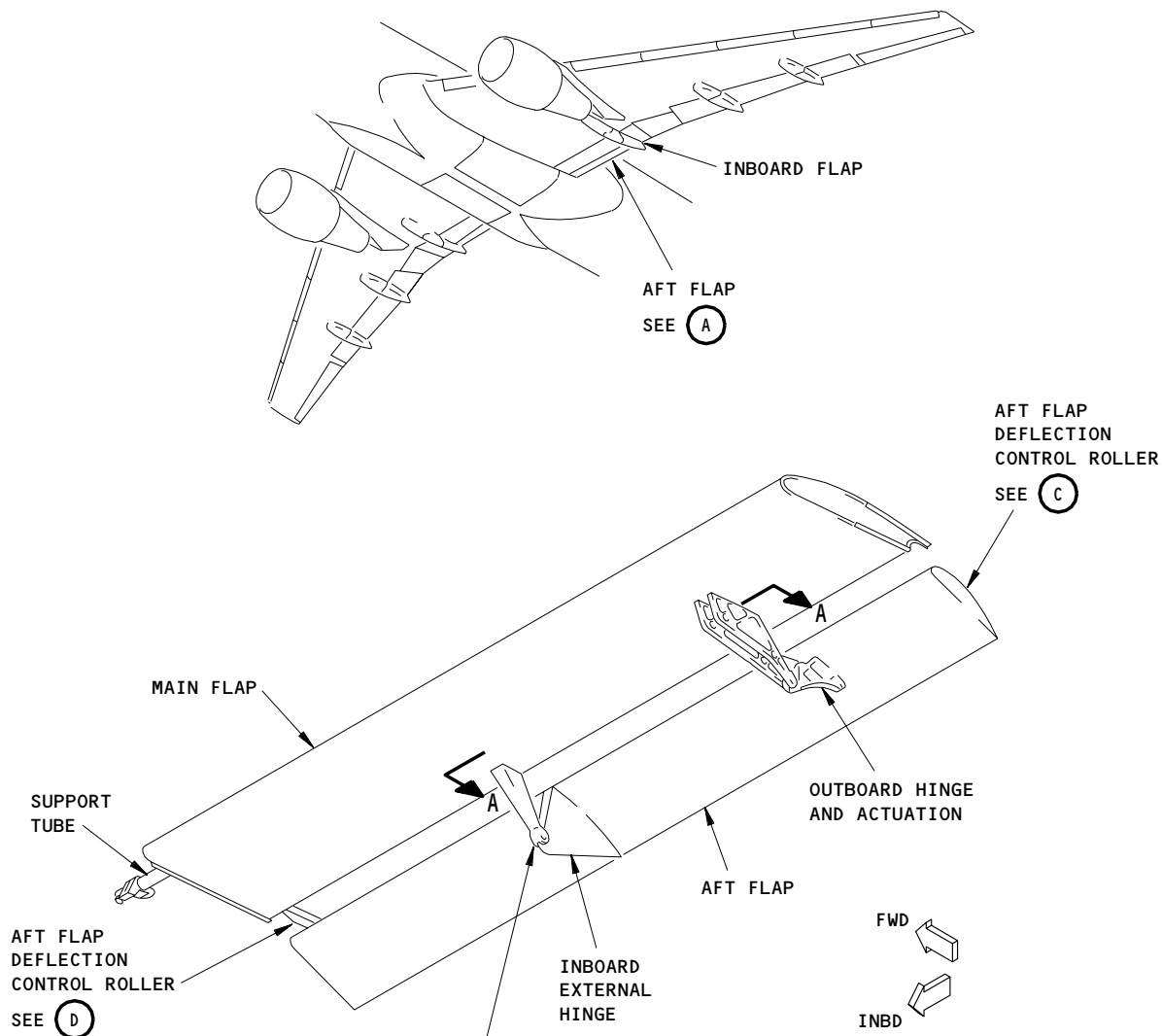
N

- 4 LUBE FITTING IS ON THE OPPOSITE SIDE (NOT SHOWN)
- 5 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Lubrication For The Inboard TE Flap
Figure 301 (Sheet 8)

EFFECTIVITY	ALL
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12-21-09



INBOARD EXTERNAL HINGE

ZERK
BMS 3-33

(1 LOCATION)

3

AFT FLAP
(LEFT AFT FLAP IS SHOWN,
RIGHT AFT FLAP IS OPPOSITE)

1 POINT

A

3 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Lubrication for the Inboard Aft Flap
Figure 302 (Sheet 1)

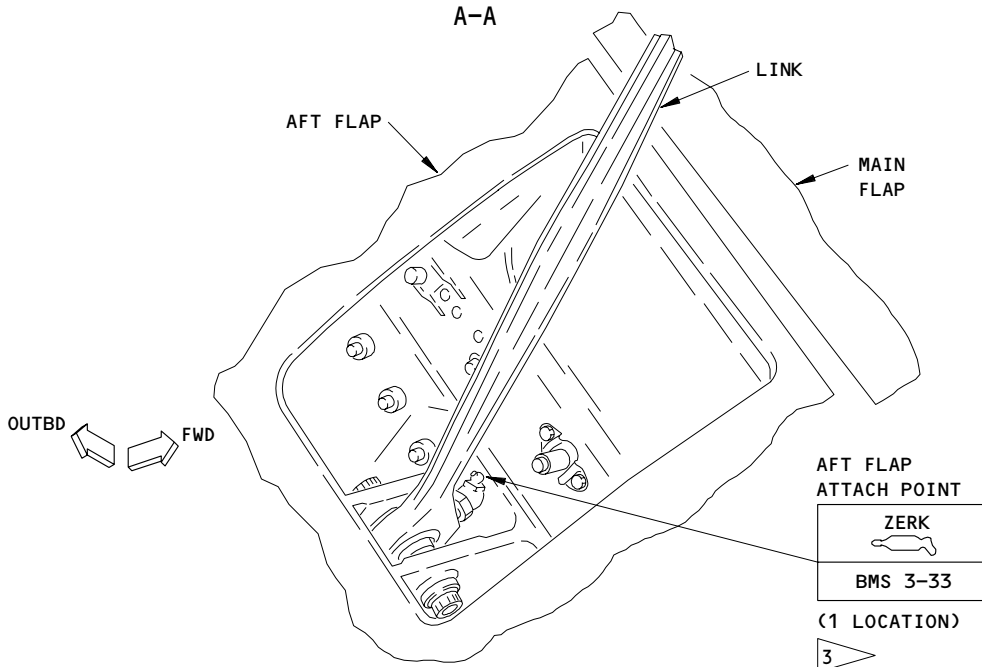
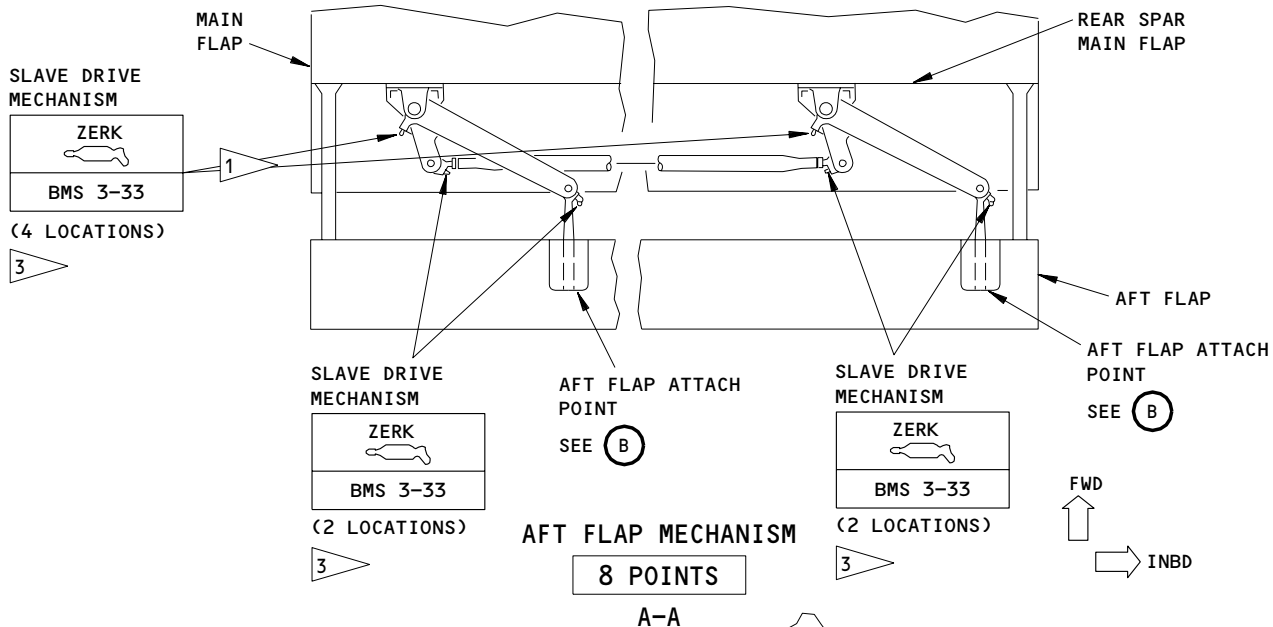
EFFECTIVITY	ALL
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12-21-09

01

Page 313
Aug 22/03

37129



**AFT FLAT ATTACH POINT
(TOP VIEW)
(2 AFT FLAP ATTACH POINT ON EACH AFT FLAP)**

1 POINT

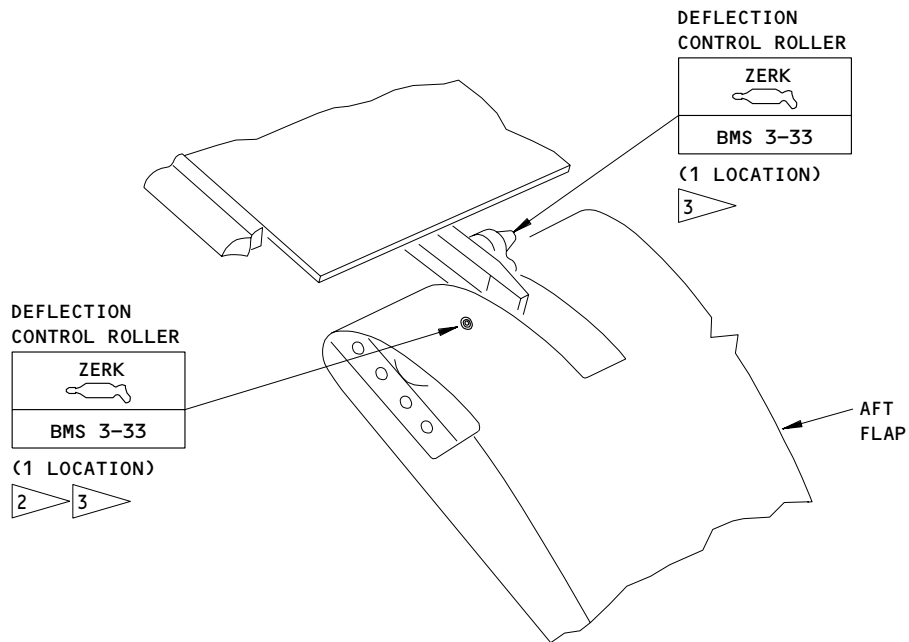
(B)

- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN).
- 3 BMS 3-33 (RECOMMENDED) MIL-PRF-23827 (ALTERNATE)

Lubrication for the Inboard Aft Flap
Figure 302 (Sheet 2)

EFFECTIVITY	ALL

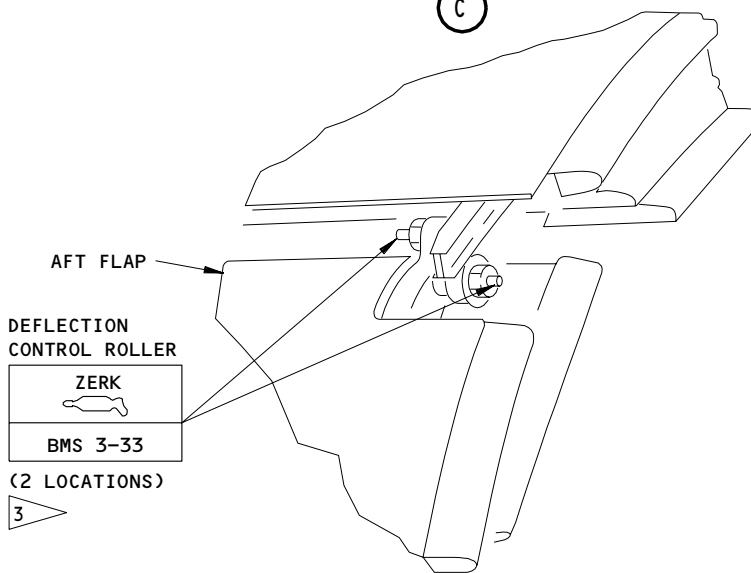
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AFT FLAP DEFLECTION CONTROL ROLLER

2 POINTS

(C)



AFT FLAP DEFLECTION CONTROL ROLLER

2 POINTS

(D)

- 2 USE THE ACCESS THROUGH THE CUTOUT IN THE FLAP.
- 3 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

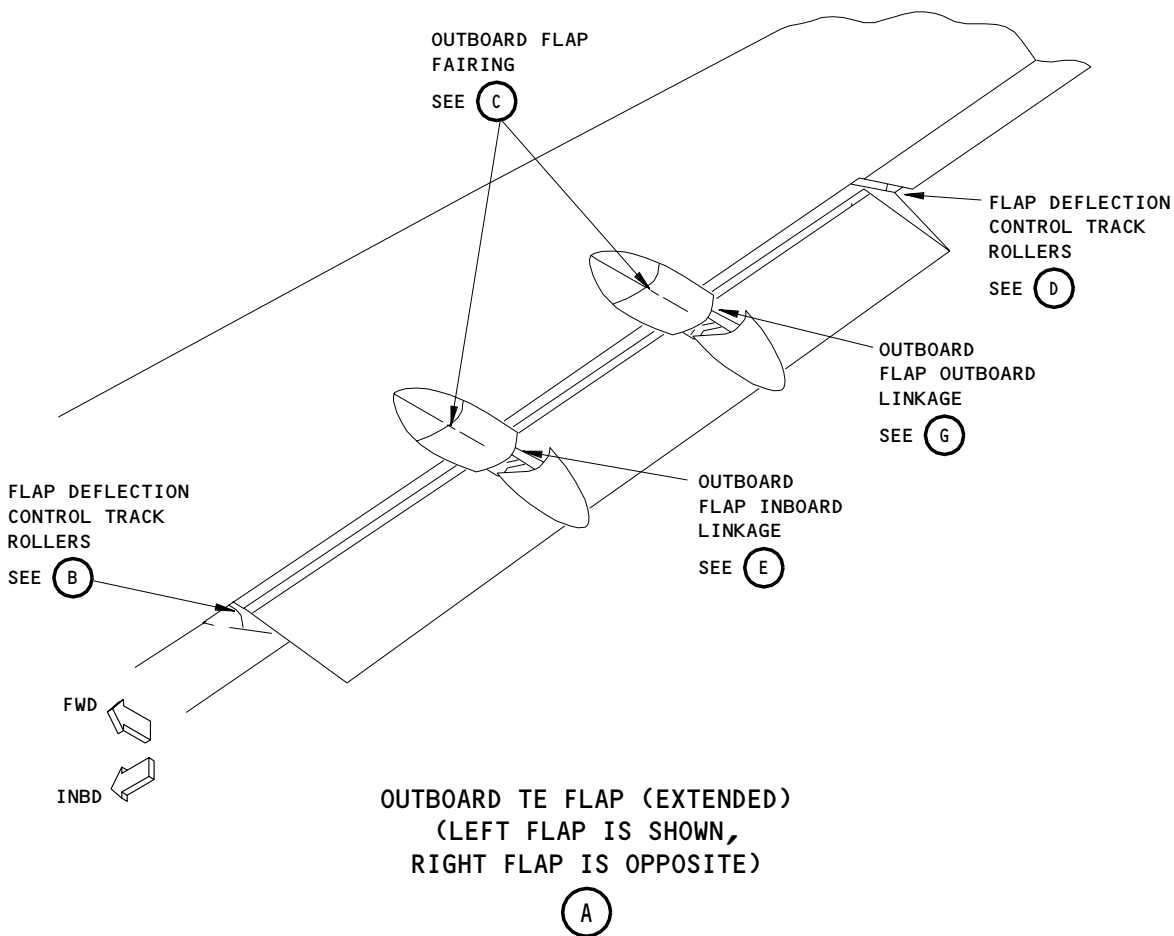
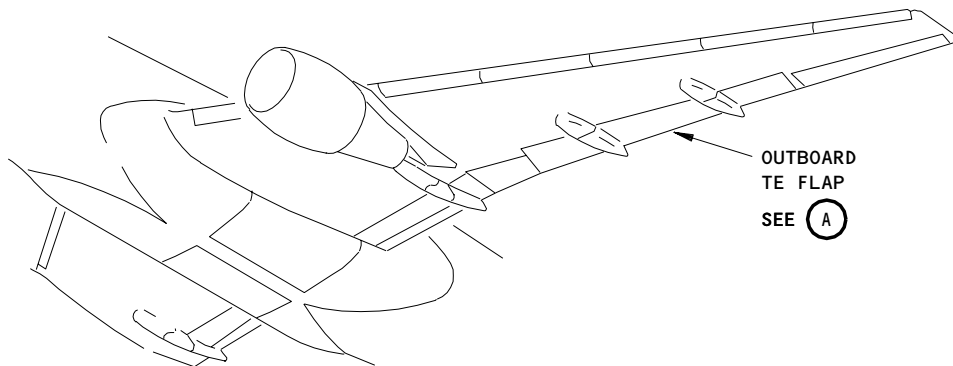
Lubrication for the Inboard Aft Flap
Figure 302 (Sheet 3)

EFFECTIVITY	ALL
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12-21-09

01

Page 315
Aug 22/03



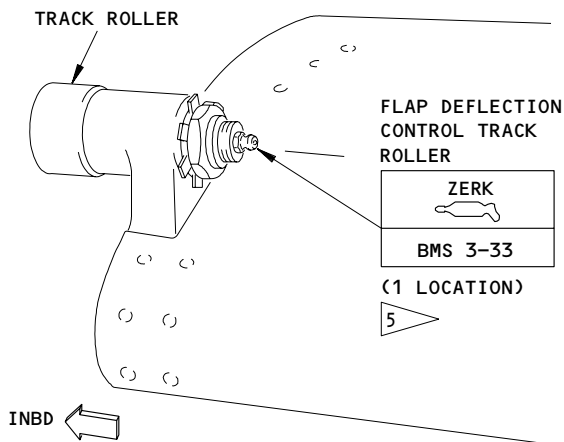
Lubrication for the Outboard TE Flap
Figure 303 (Sheet 1)

EFFECTIVITY	
	ALL

12-21-09

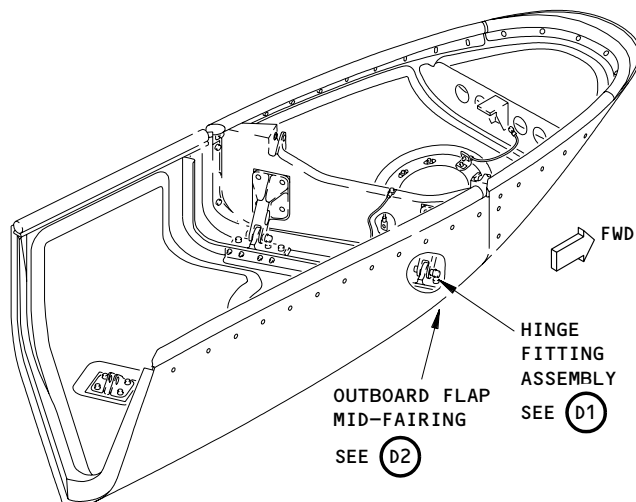
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Page 316
Dec 22/05



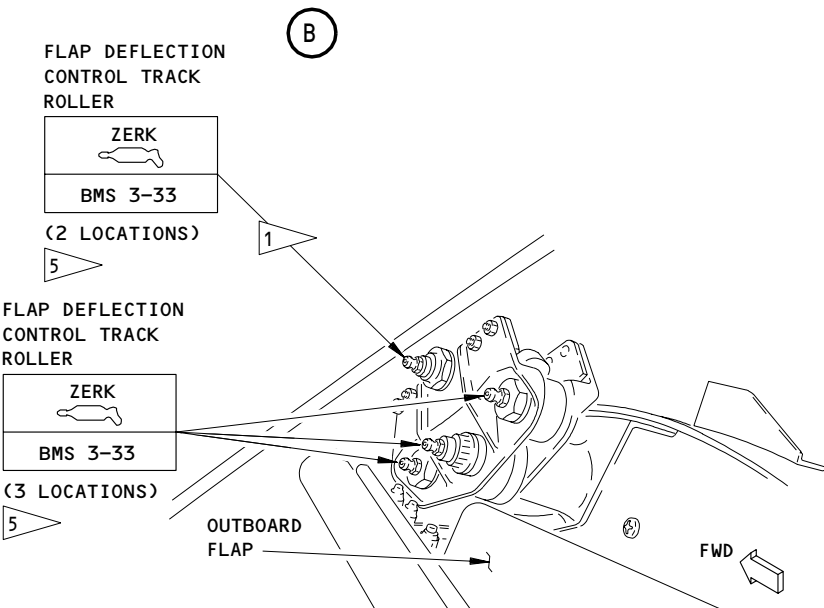
FLAP DEFLECTION CONTROL TRACK ROLLERS
(FRONT VIEW)

1 POINT



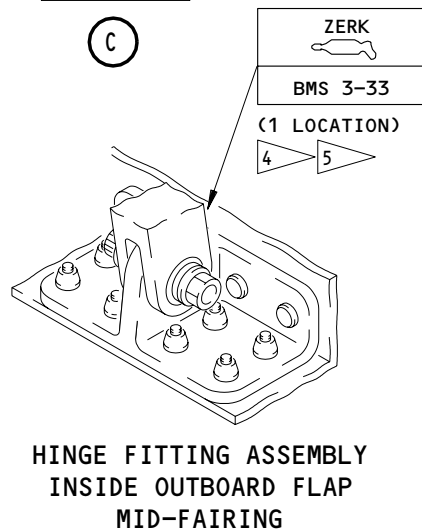
OUTBOARD FLAP MID-FAIRING
(HINGE FITTING ASSEMBLY)

1 POINT



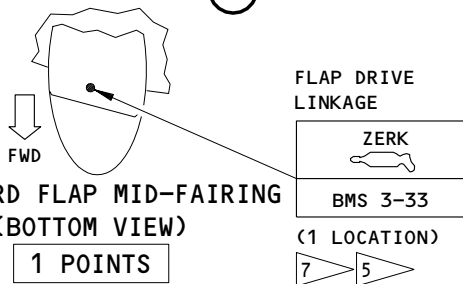
FLAP DEFLECTION CONTROL TRACK ROLLERS

5 POINTS



HINGE FITTING ASSEMBLY
INSIDE OUTBOARD FLAP
MID-FAIRING

(D1)



OUTBOARD FLAP MID-FAIRING
(BOTTOM VIEW)

1 POINTS

- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN).
- 4 LUBE POINT IS ON HINGE FITTING ASSEMBLY INSIDE THE OUTBOARD FLAP MID-FAIRING.
- 5 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)
- 7 LUBE POINT IS OUTSIDE OF FAIRING

Lubrication for the Outboard TE Flap
Figure 303 (Sheet 2)

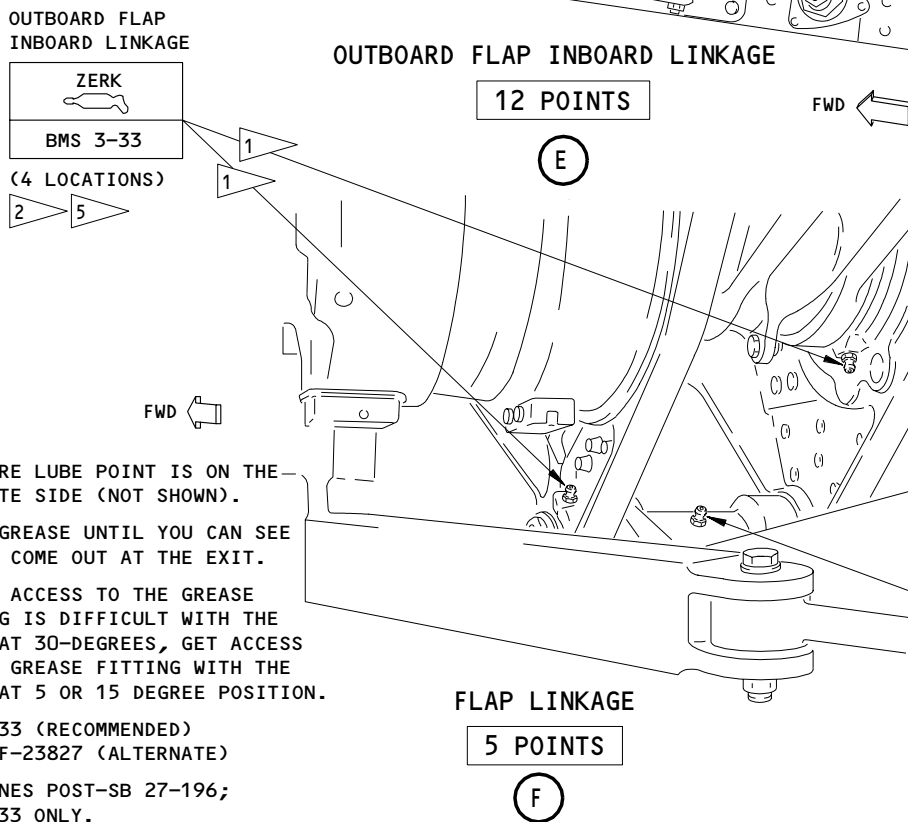
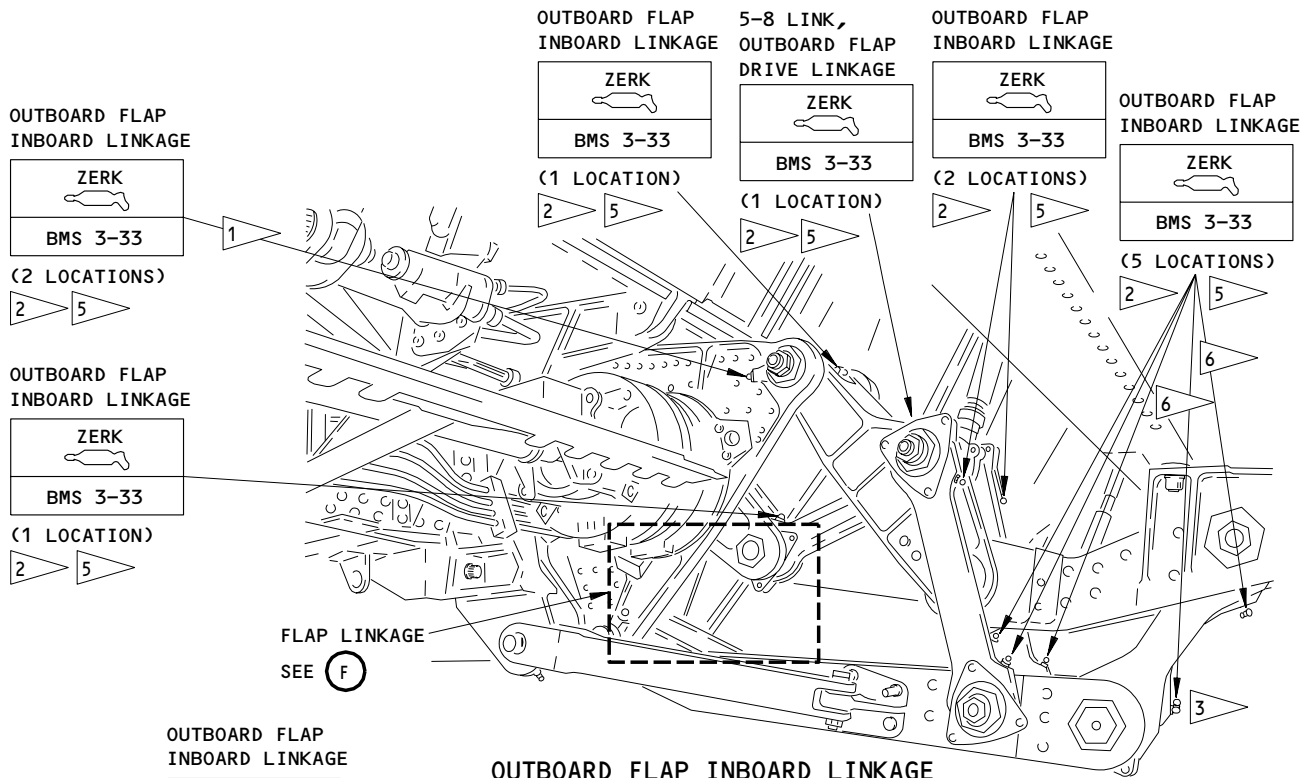
EFFECTIVITY

ALL

12-21-09

01

Page 317
Apr 22/09



- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN).
- 2 APPLY GREASE UNTIL YOU CAN SEE GREASE COME OUT AT THE EXIT.
- 3 IF THE ACCESS TO THE GREASE FITTING IS DIFFICULT WITH THE FLAPS AT 30-DEGREES, GET ACCESS TO THE GREASE FITTING WITH THE FLAPS AT 5 OR 15 DEGREE POSITION.
- 5 BMS 3-33 (RECOMMENDED) MIL-PRF-23827 (ALTERNATE)
- 6 AIRPLANES POST-SB 27-196; BMS 3-33 ONLY.

Lubrication for the Outboard TE Flap
Figure 303 (Sheet 3)

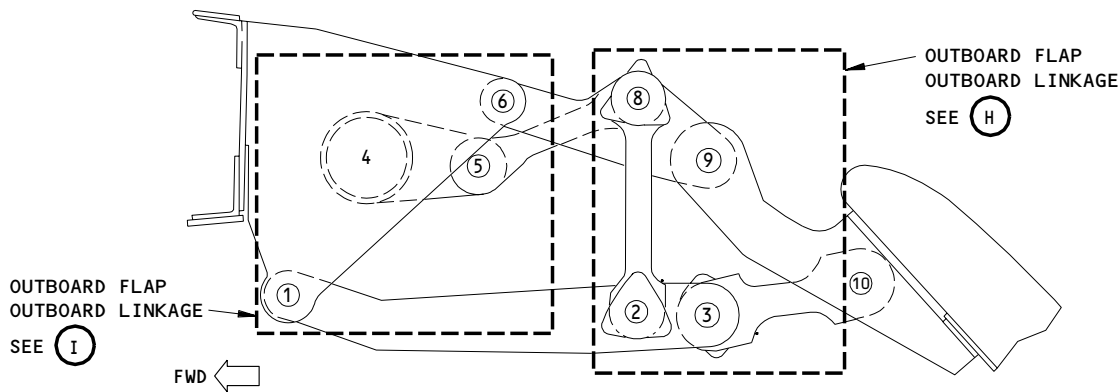
EFFECTIVITY

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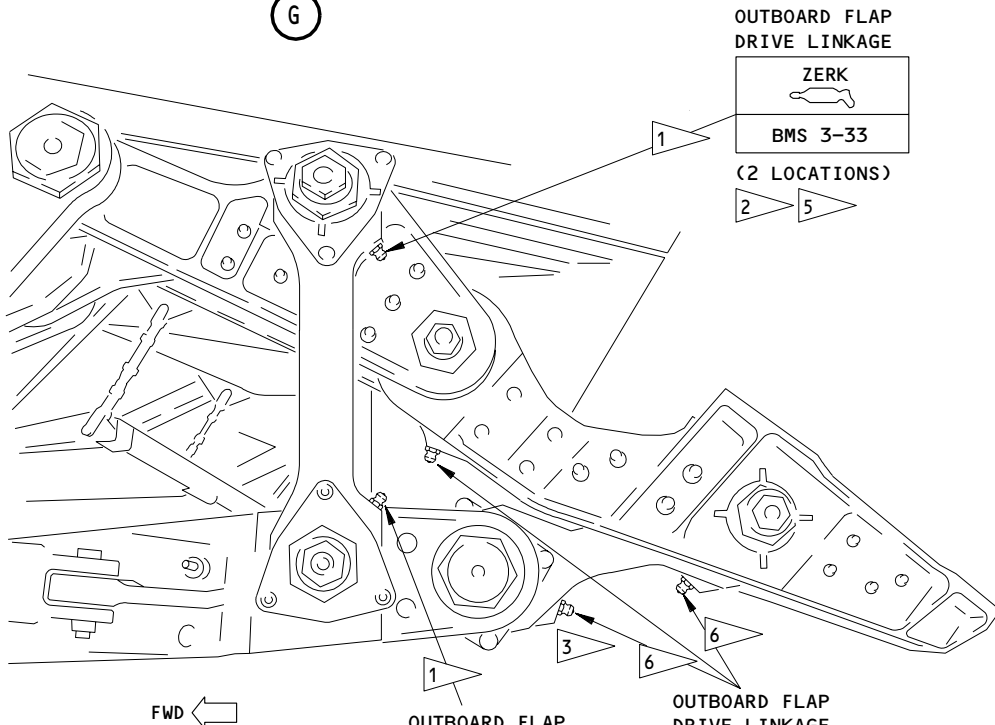
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Page 318
Dec 22/07



OUTBOARD FLAP OUTBOARD LINKAGE

(G)



OUTBOARD FLAP DRIVE LINKAGE

ZERK
BMS 3-33

(2 LOCATIONS)

2 5

OUTBOARD FLAP DRIVE LINKAGE

ZERK
BMS 3-33

(3 LOCATIONS)

2 5

- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN)
- 2 APPLY GREASE UNTIL YOU CAN SEE GREASE COME OUT AT THE EXIT
- 3 IF THE ACCESS TO THE GREASE FITTING IS DIFFICULT WITH THE FLAPS AT 30-DEGREES, GET ACCESS TO THE GREASE FITTING WITH THE FLAPS AT 5 OR 15 DEGREE POSITION.
- 5 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)
- 6 AIRPLANES POST-SB 27-196;
BMS 3-33.

OUTBOARD FLAP OUTBOARD LINKAGE

7 POINTS

(H)

Lubrication for the Outboard TE Flap
Figure 303 (Sheet 4)

EFFECTIVITY

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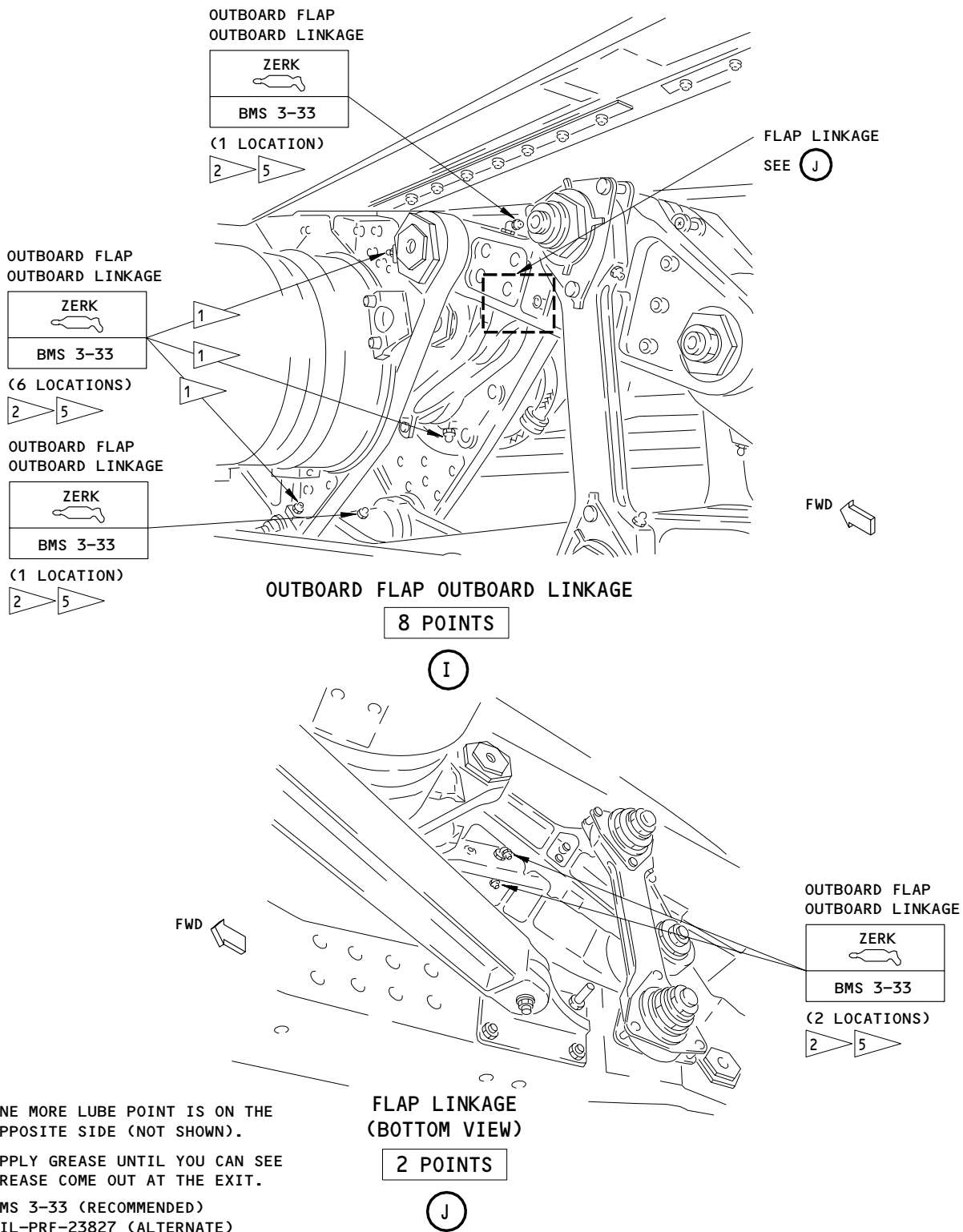
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Page 319
Dec 22/07

613181

BOEING

767 MAINTENANCE MANUAL



Lubrication for the Outboard TE Flap
Figure 303 (Sheet 5)

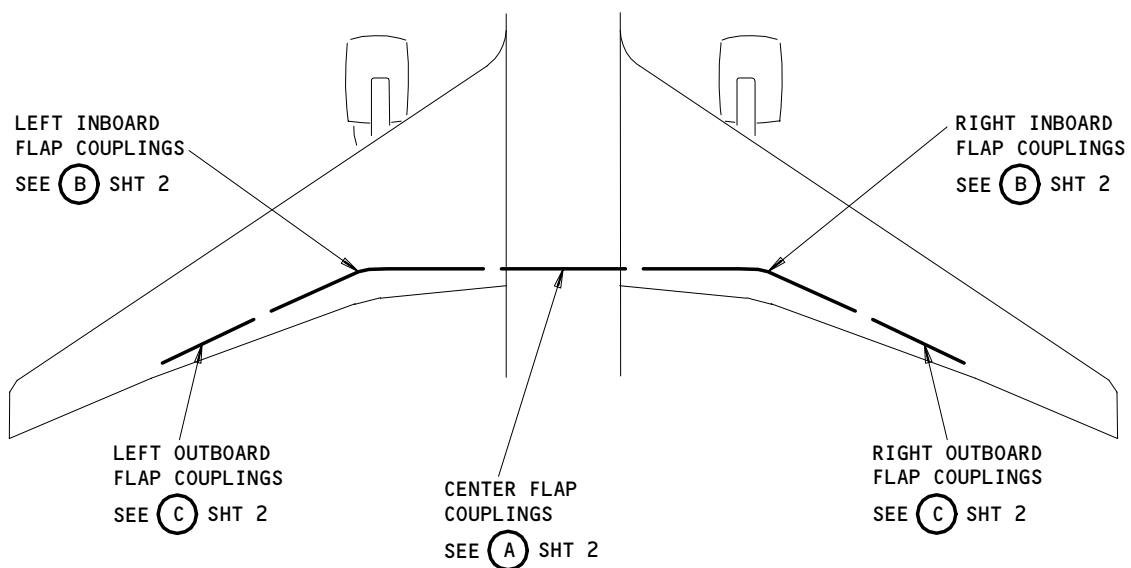
EFFECTIVITY

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12-21-09

01

Page 320
Aug 22/03



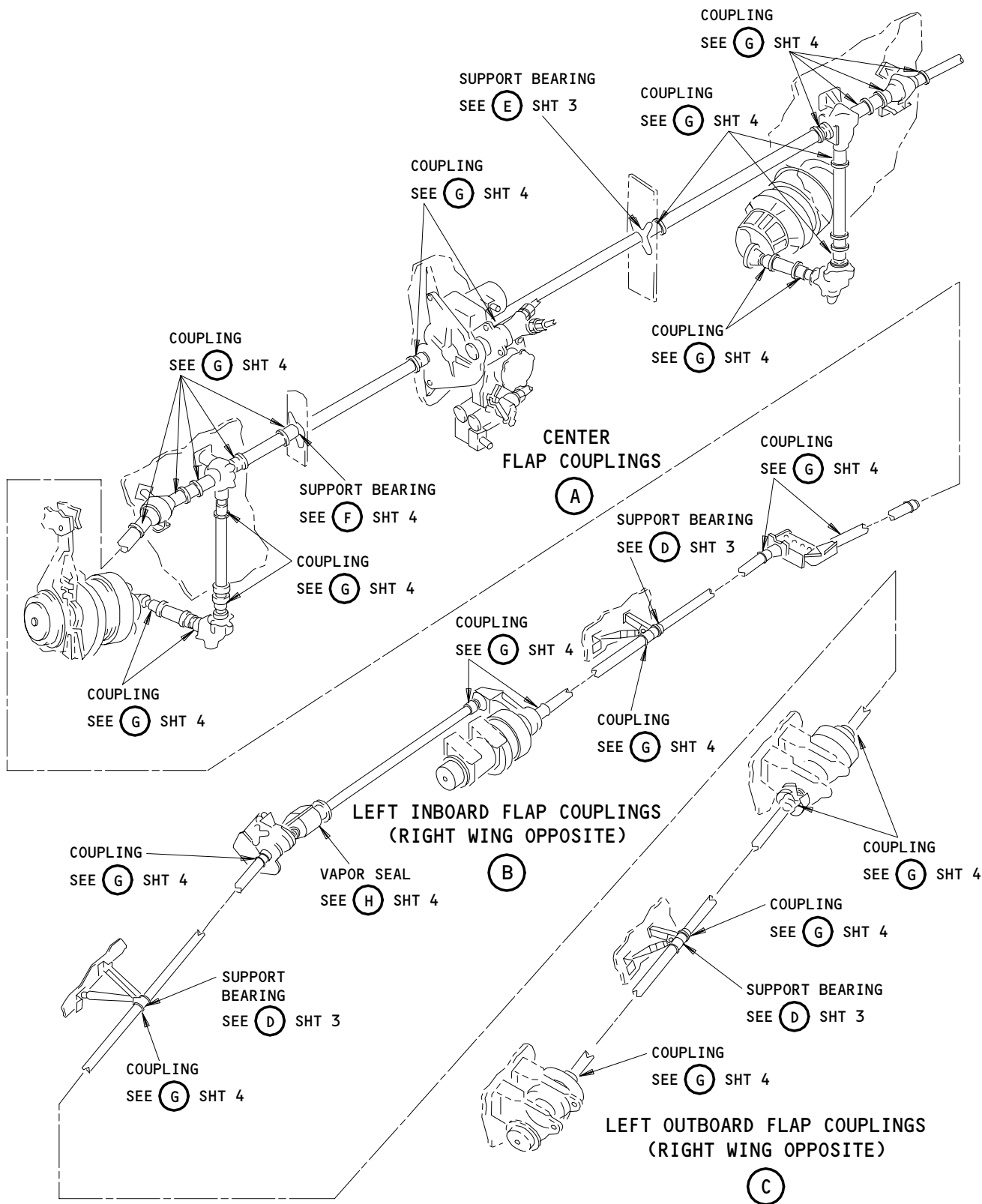
Lubrication for the TE Flap Drive
Figure 304 (Sheet 1)

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12-21-09

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Page 321
Aug 22/99



Lubrication for the TE Flap Drive
Figure 304 (Sheet 2)

EFFECTIVITY

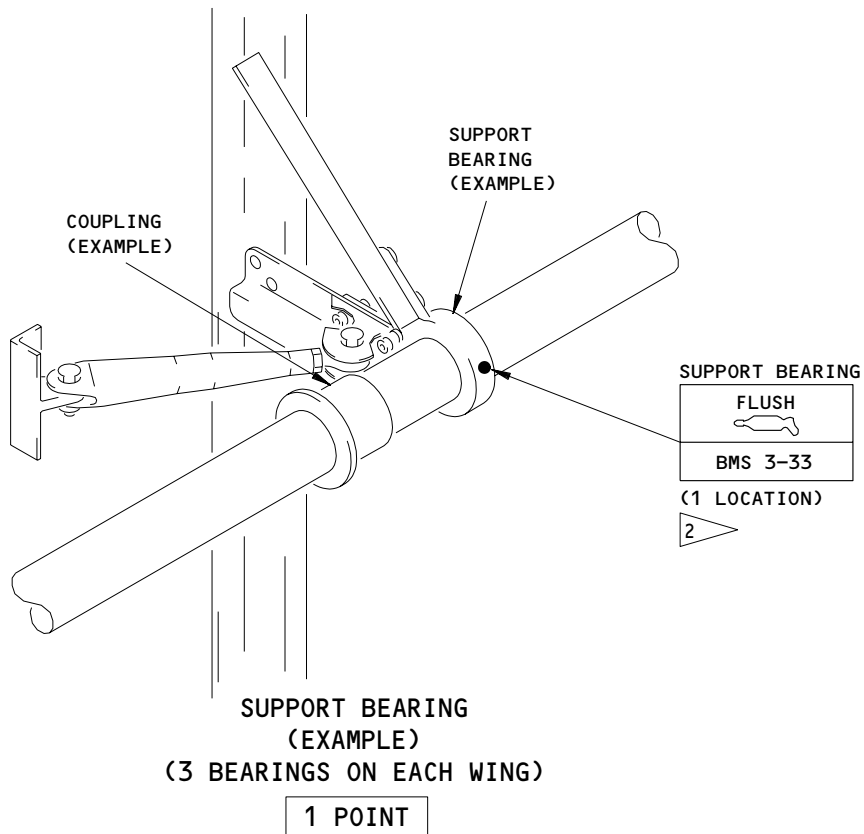
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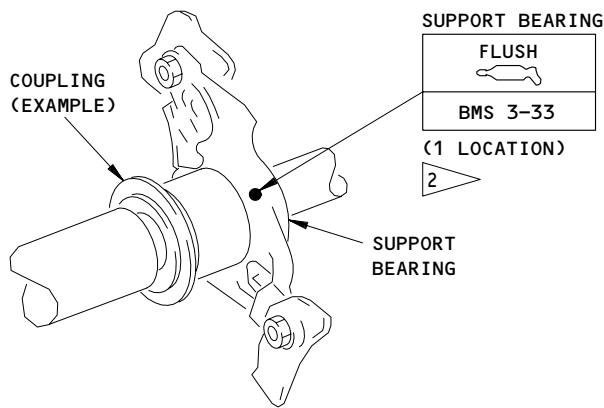
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Page 322
Aug 22/99

613808



(D)



(E)

2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Lubrication for the TE Flap Drive
Figure 304 (Sheet 3)

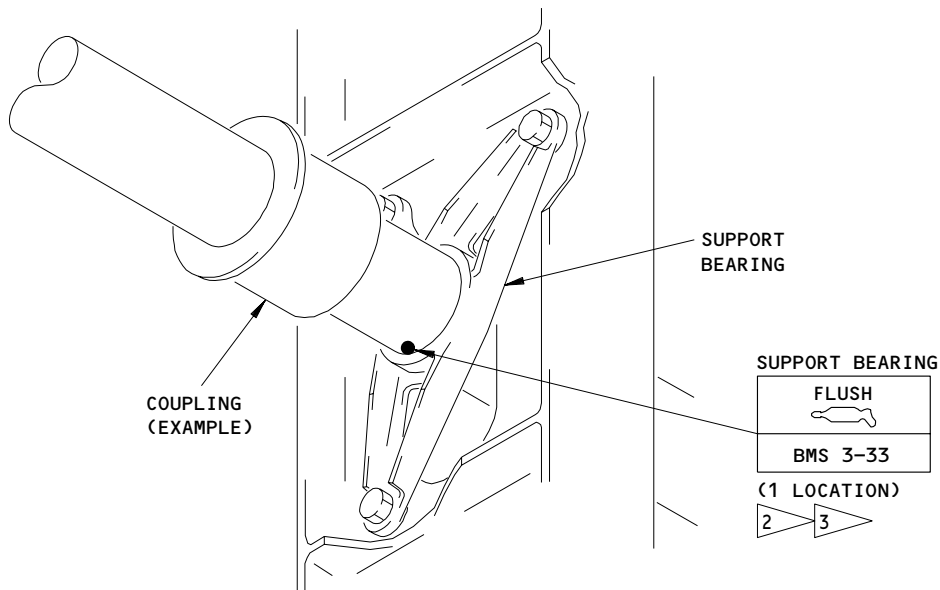
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12-21-09

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Page 323
Aug 22/03

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SUPPORT BEARING

1 POINT

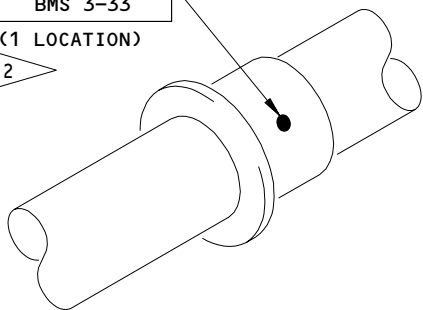
(F)

COUPLING

FLUSH
BMS 3-33

(1 LOCATION)

2

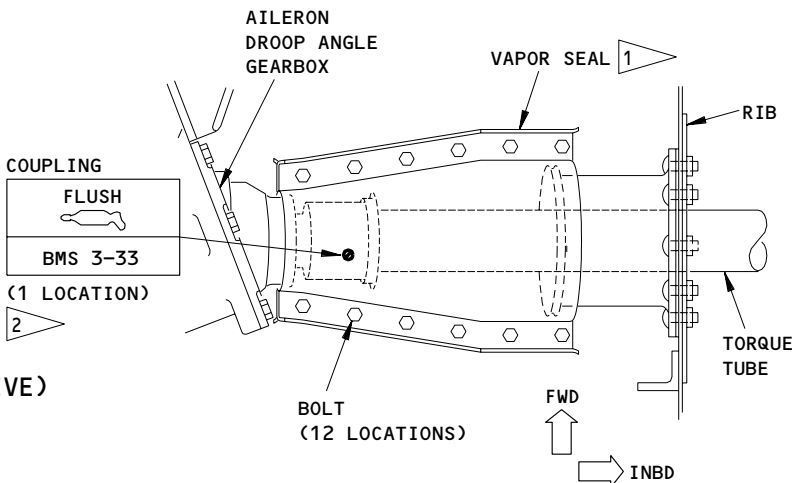


COUPLING (EXAMPLE)

(42 COUPLINGS FOR THE FLAP DRIVE)

1 POINT

(G)



VAPOR SEAL (LEFT WING IS SHOWN, RIGHT WING IS OPPOSITE) (TOP VIEW)

1 POINT

(H)

- 1 REMOVE THE VAPOR SEAL TO LUBRICATE THE COUPLING MAKE SURE YOU INSTALL THE VAPOR SEAL WITH THE FLANGES PARALLEL TO THE GROUND
- 2 BMS 3-33 (RECOMMENDED) MIL-PRF-23827 (ALTERNATE)
- 3 NOT ON ALL AIRPLANES

Lubrication for the TE Flap Drive
Figure 304 (Sheet 4)

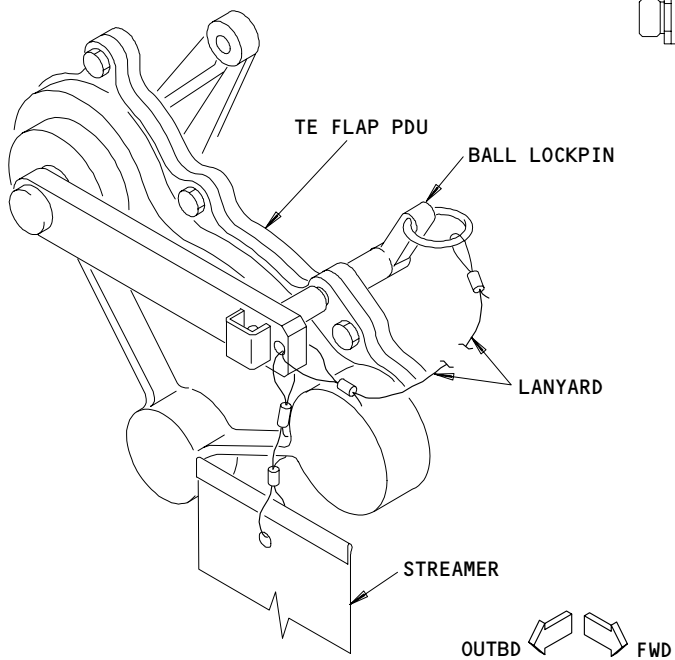
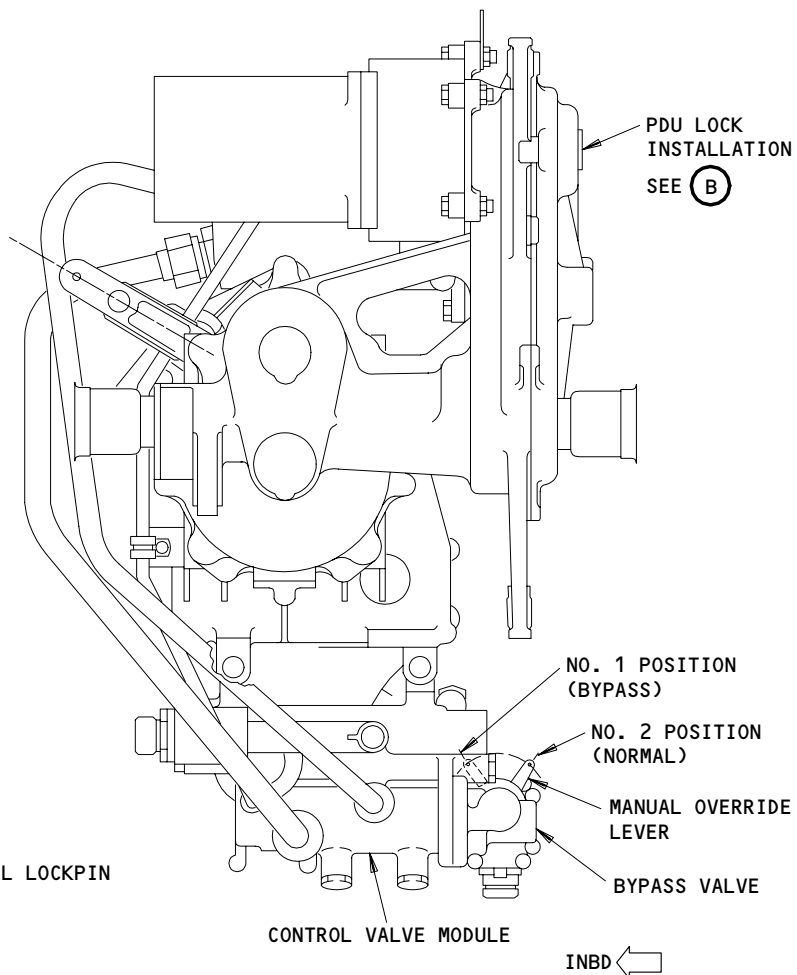
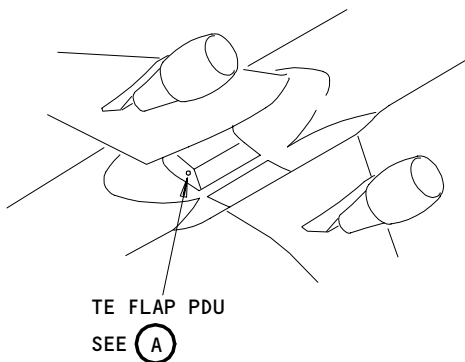
EFFECTIVITY

ALL

12-21-09

01

Page 324
Aug 22/03



TE FLAP PDU
(AFT VIEW)
(A)

PDU LOCK INSTALLATION

(B)

PDU Lock and Bypass Valve for the TE Flap PDU
Figure 305

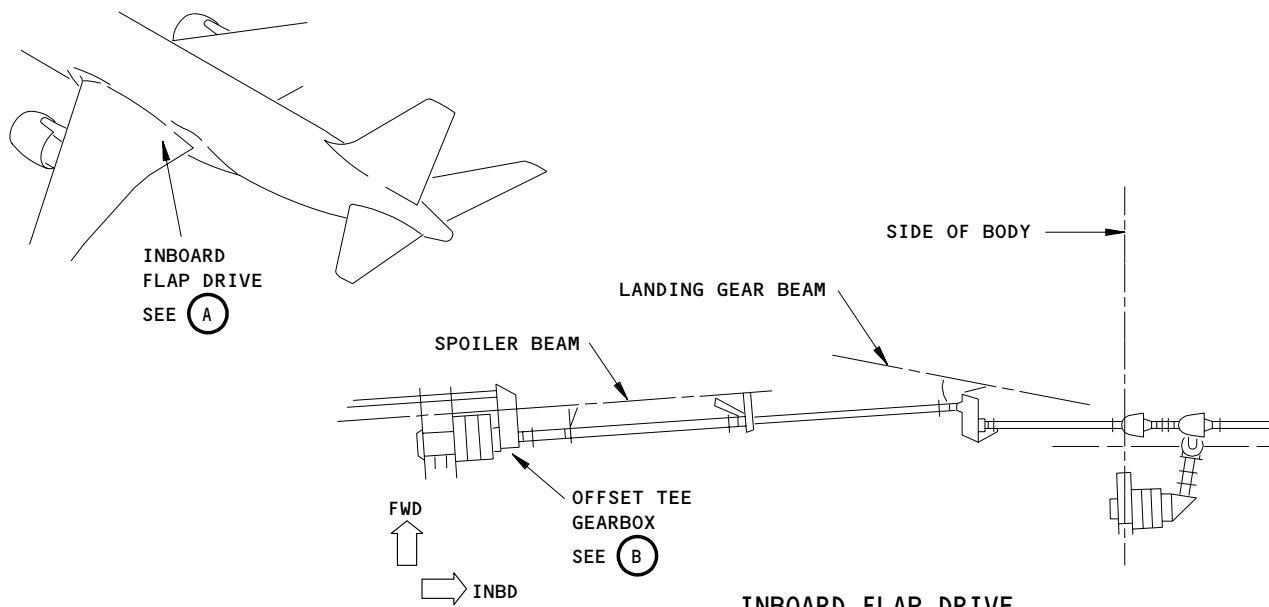
EFFECTIVITY

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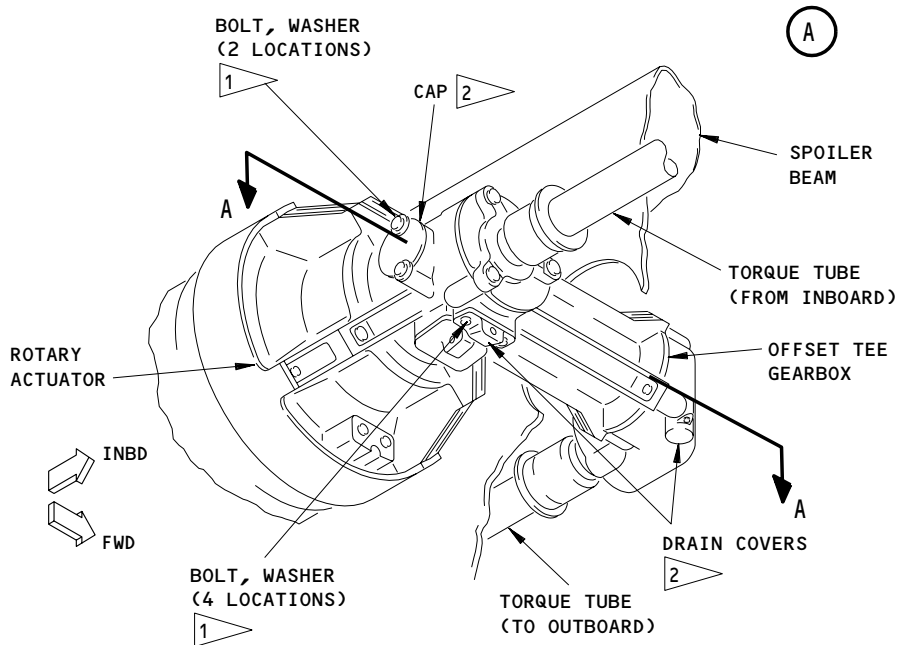
12-21-09

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Page 325
Aug 22/99



**INBOARD FLAP DRIVE
(LEFT WING IS SHOWN, RIGHT WING IS OPPOSITE)**



**OFFSET TEE GEARBOX
(INBOARD FLAP, OUTBOARD ROTARY ACTUATOR)**

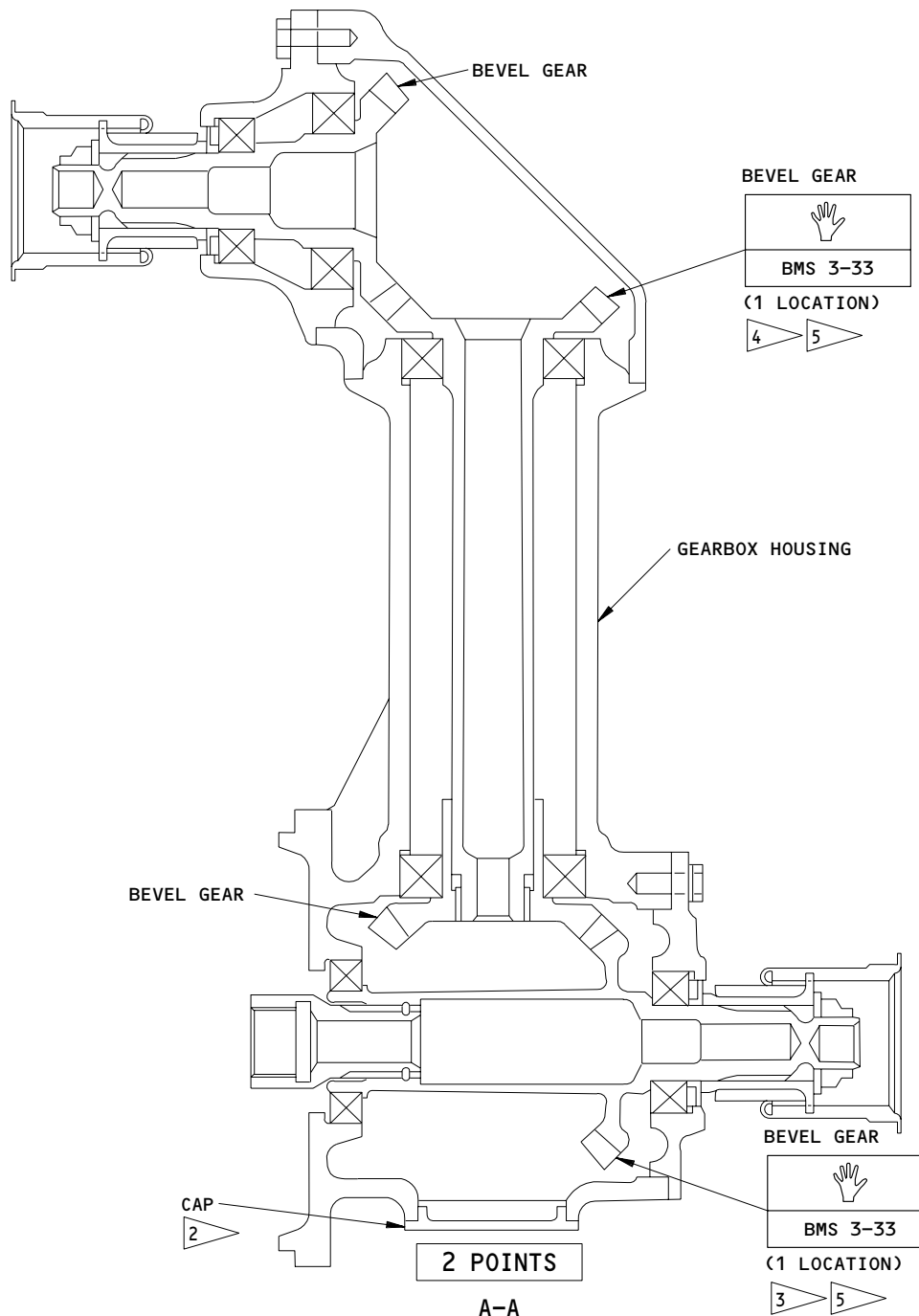
1 INSTALL THE BOLTS AND WASHERS WITH WET BMS 10-11 PRIMER.

2 AFTER INSTALLATION, APPLY A BEAD OF BMS 5-26 OR BMS 5-45 SEALANT ALONG THE MATING EDGES BETWEEN THE COVER, BOLTS, GEAR HOUSING.

**Lubrication for the Offset Tee Gearbox
Figure 306 (Sheet 1)**

EFFECTIVITY	ALL
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12-21-09



- 3 REMOVE THE CAP OR THE DRAIN COVER TO LUBRICATE THE BEVEL GEARS AT THE AFT END OF THE GEARBOX. APPLY 0.25 LB OF GREASE BMS 3-33 TO THE BEVEL GEARS BY HAND OR HAND PUMP.
- 4 REMOVE THE DRAIN COVER TO LUBRICATE THE BEVEL GEARS AT THE FORWARD END OF THE GEARBOX. APPLY 0.25 LB OF GREASE BMS 3-33 TO THE BEVEL GEARS BY HAND OR HAND PUMP.
- 5 BMS 3-33 (RECOMMENDED)
MIL-G-21164 AND MIL-PRF-23827 (ALTERNATE)

Lubrication for the Offset Tee Gearbox
Figure 306 (Sheet 2)

EFFECTIVITY	
	ALL

12-21-09

01

Page 327
Dec 22/07

804655

SPOILER/SPEEDBRAKE CONTROL – SERVICING (LUBRICATION)

1. General

A. This procedure contains these tasks:

- Inboard Spoilers - Lubrication
- Outboard Spoilers - Lubrication

B. The spoilers are numbered 1 thru 12, from the outboard left wing spoiler to the outboard right wing spoiler.

TASK 12-21-10-613-001

2. Inboard Spoilers – Lubrication

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (recommended)
- (2) D00013 Grease - MIL-PRF-23827 (alternative)

B. References

- (1) AMM 06-44-00/201, Wing Access Doors and Panels
- (2) AMM 27-51-00/201, Trailing Edge Flap System
- (3) AMM 27-61-00/201, Spoiler/Speedbrake Control System

C. Access

(1) Location Zones

- 552 MLG Support Beam and Rear Spar to Trailing Edge (Left)
- 652 MLG Support Beam and Rear Spar to Trailing Edge (Right)

(2) Access Panels

- 552BB Landing Gear Support Beam (Left)
- 652BB Landing Gear Support Beam (Right)
- 552GB Landing Gear Support Beam (Left)
- 652GB Landing Gear Support Beam (Right)

D. Prepare for the Lubrication

S 043-002

WARNING: MAKE SURE TO DO THE SPOILER/SPEEDBRAKE DEACTIVATION PROCEDURE. ACCIDENTAL SPOILER MOVEMENT CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Do the deactivation procedure for the spoilers (AMM 27-61-00/201).

S 863-003

(2) Extend the trailing edge flaps (AMM 27-51-00/201).

S 043-004

(3) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).

EFFECTIVITY

ALL

12-21-10

01

Page 301
Dec 22/02

E. Inboard Spoilers - Lubrication (Number 5, 6, 7 and 8)

S 013-005

- (1) Open access panels 552BB, 552GB, 652BB, and 652GB (AMM 06-44-00/201).

S 643-006

- (2) Lubricate the inboard spoilers as shown (Fig. 301).

S 413-007

- (3) Close access panels 552BB, 552GB, 652BB, and 652GB (AMM 06-44-00/201).

F. Put the Airplane Back to Its Usual Condition

S 443-009

- (1) Do the activation procedure for the spoilers (AMM 27-61-00/201).

S 443-010

- (2) Do the activation procedure for the trailing edge flaps (AMM 27-51-00/201).

TASK 12-21-10-643-011

3. Outboard Spoilers - Lubrication

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (recommended)
- (2) D00013 Grease - MIL-PRF-23827 (alternative)

B. References

- (1) AMM 27-51-00/201, Trailing Edge Flap System
- (2) AMM 27-61-00/201, Spoiler/Speedbrake Control System

C. Access

(1) Location Zones

- | | |
|-----|---|
| 552 | MLG Support Beam and Rear Spar to Trailing Edge (Left) |
| 652 | MLG Support Beam and Rear Spar to Trailing Edge (Right) |

D. Prepare for the Lubrication

S 043-012

WARNING: MAKE SURE TO DO THE SPOILER/SPEEDBRAKE DEACTIVATION PROCEDURE. ACCIDENTAL SPOILER MOVEMENT CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Do the deactivation procedure for the spoilers (AMM 27-61-00/201).

EFFECTIVITY

ALL

12-21-10

01

Page 302
Dec 22/02

- S 863-013
- (2) Extend the trailing edge flaps (AMM 27-51-00/201).

- S 043-014
- (3) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201).
- E. Outboard Spoilers - Lubrication (Number 1 thru 4 and 9 thru 12)
 - S 643-015
 - (1) Lubricate the outboard spoilers as shown (Fig. 302).
- F. Put the Airplane Back to Its Usual Condition
 - S 443-016
 - (1) Do the activation procedure for the spoilers (AMM 27-61-00/201).

 - S 443-017
 - (2) Do the activation procedure for the trailing edge flaps (AMM 27-51-00/201).

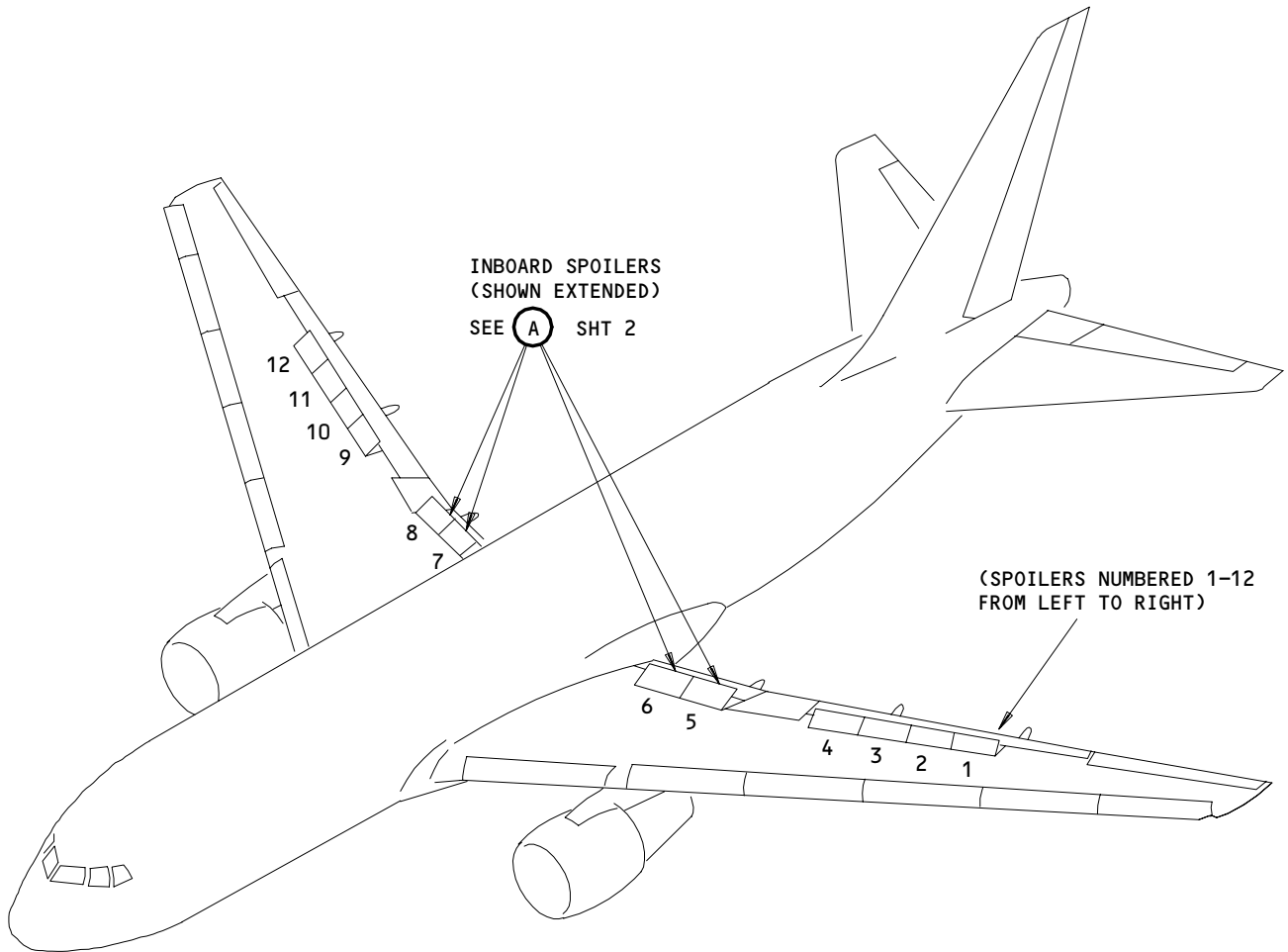
EFFECTIVITY

ALL

12-21-10

01

Page 303
Dec 10/98



Inboard Spoilers/Speedbrakes Servicing (Lubrication)
Figure 301 (Sheet 1)

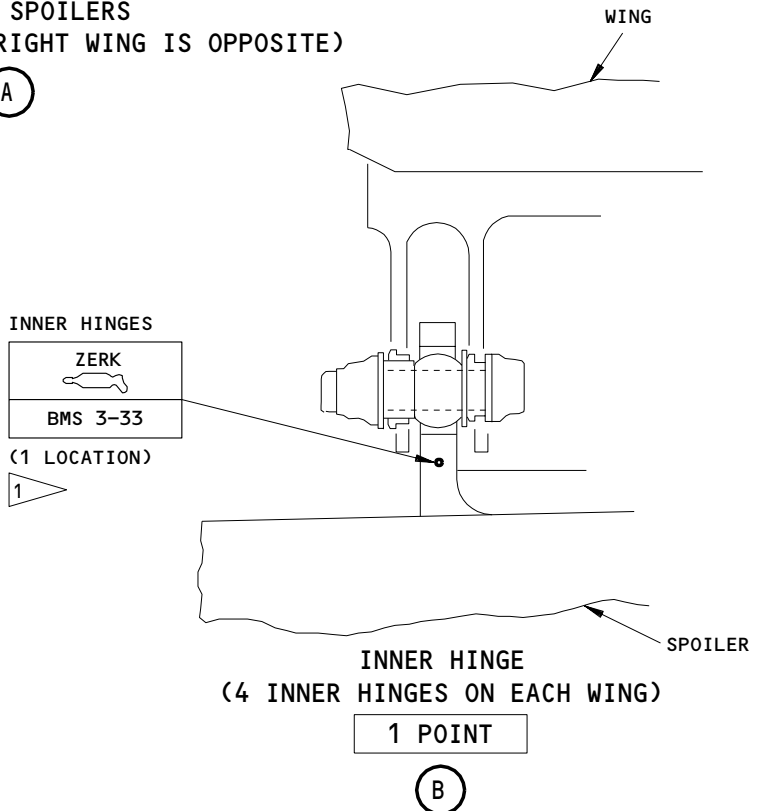
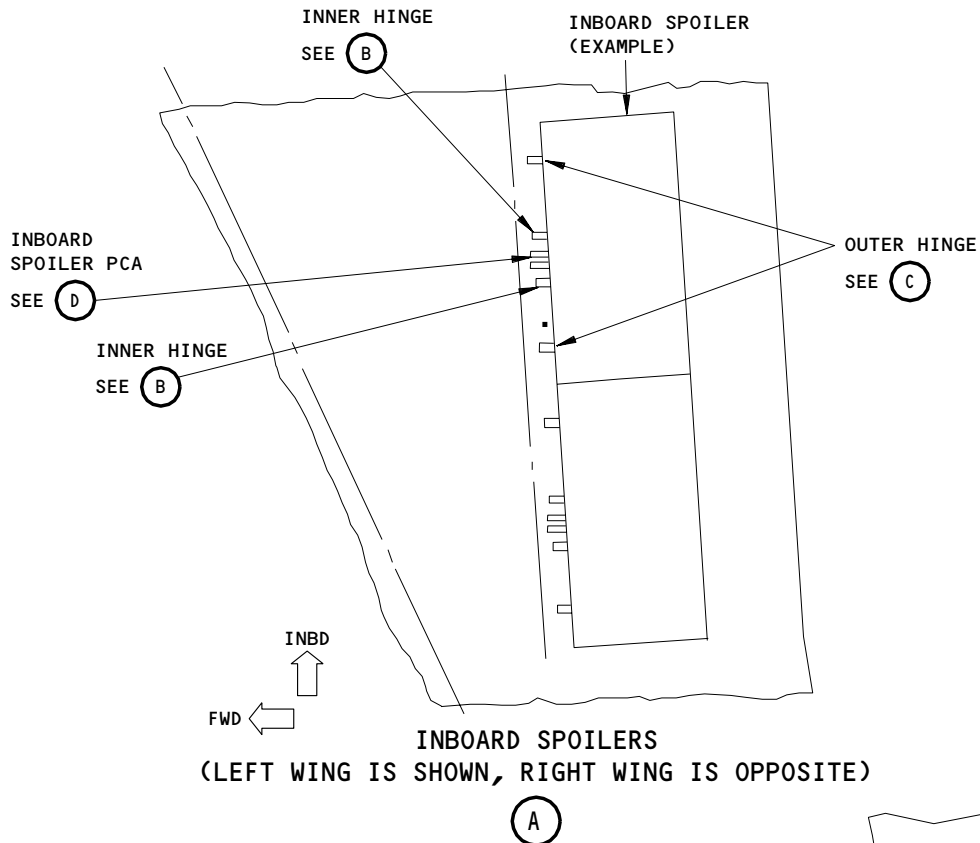
EFFECTIVITY	
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12-21-10

01

Page 304
May 10/91

588209



1 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

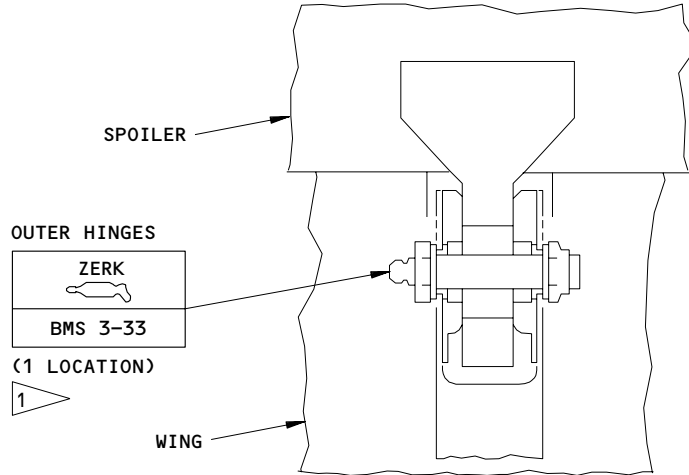
Inboard Spoilers/Speedbrakes Servicing (Lubrication)
Figure 301 (Sheet 2)

EFFECTIVITY	ALL
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12-21-10

01

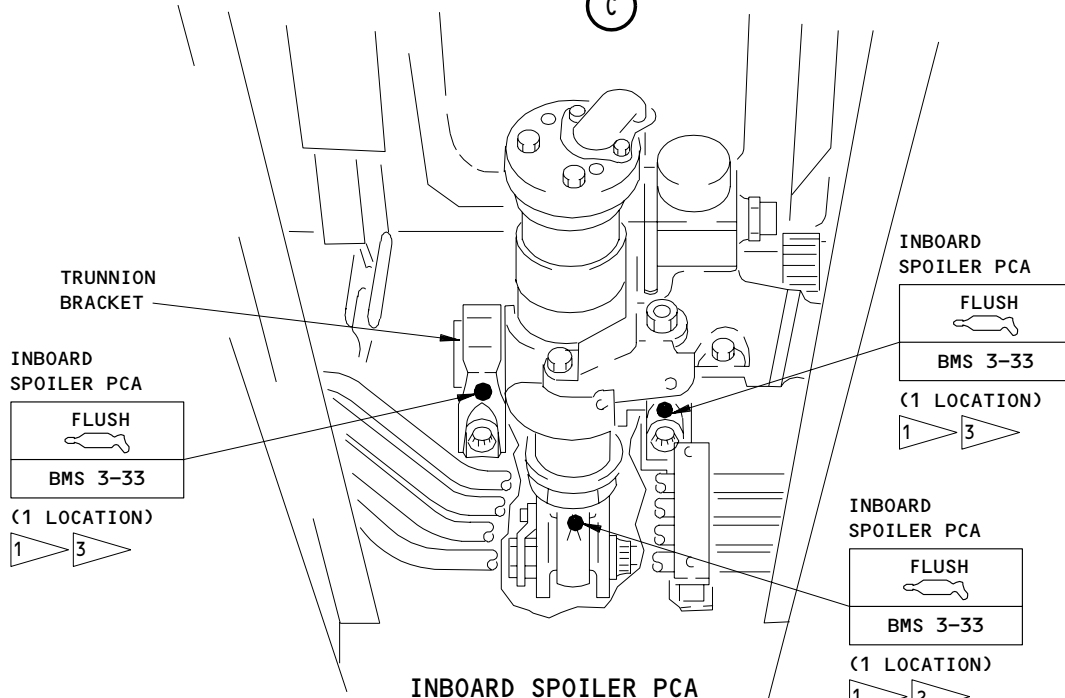
Page 305
Aug 22/03



**OUTER HINGE
(4 OUTER HINGES ON EACH WING)**

1 POINT

(C)



**INBOARD SPOILER PCA
(2 INBOARD PCAs ON EACH WING)**

3 POINTS

(D)

- 1 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)
- 2 LUBRICATE ONE OF THE TWO LUBE POINTS
LOCATED ON EACH SIDE OF THE ROD END
- 3 LUBRICATE ONE OF THE TWO LUBE POINTS
LOCATED ON EACH SIDE OF THE BRACKET

**Inboard Spoilers/Speedbrakes Servicing (Lubrication)
Figure 301 (Sheet 3)**

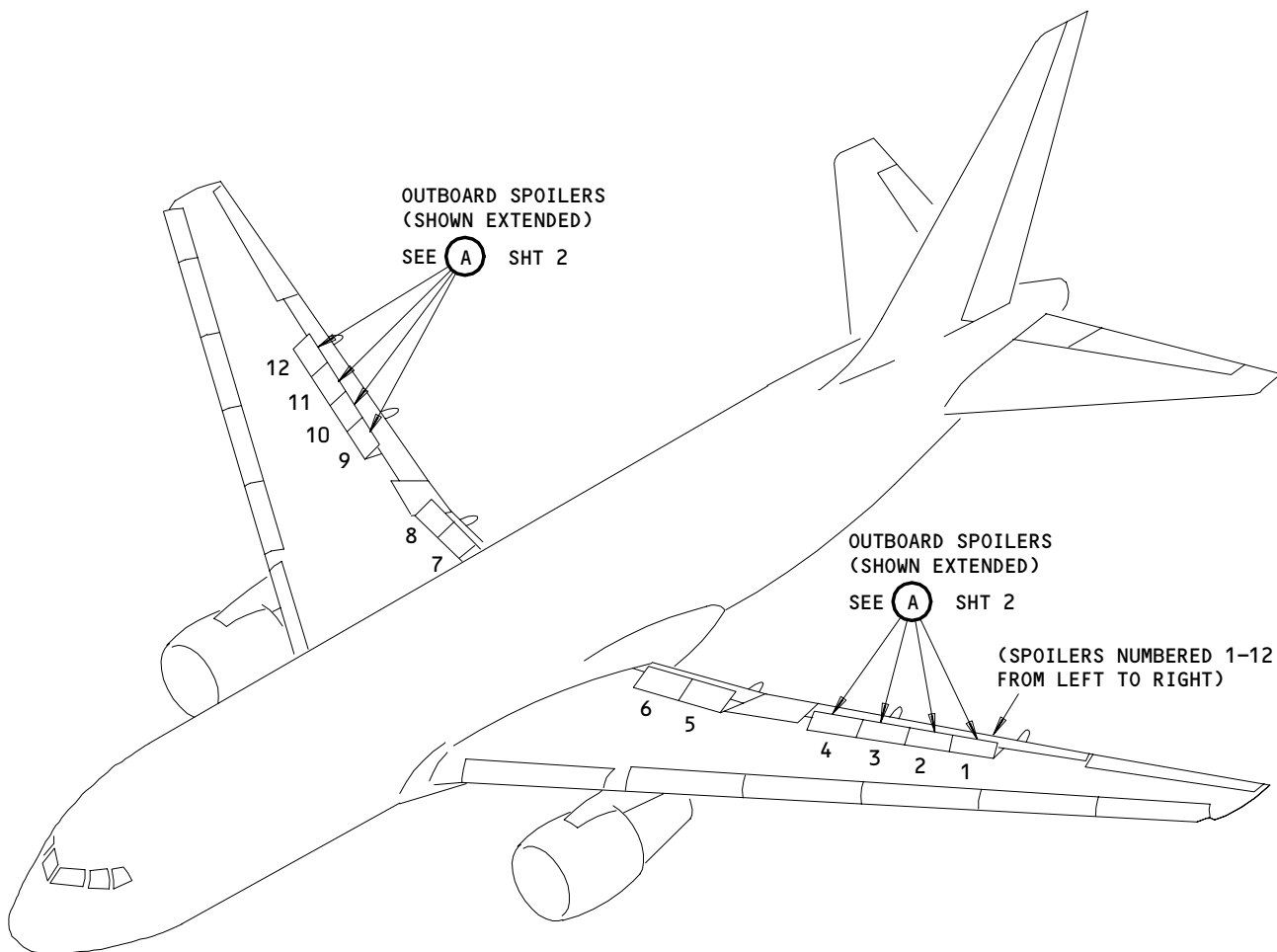
EFFECTIVITY

ALL

12-21-10

01

Page 306
Aug 22/05



Outboard Spoilers/Speedbrakes Servicing (Lubrication)
Figure 302 (Sheet 1)

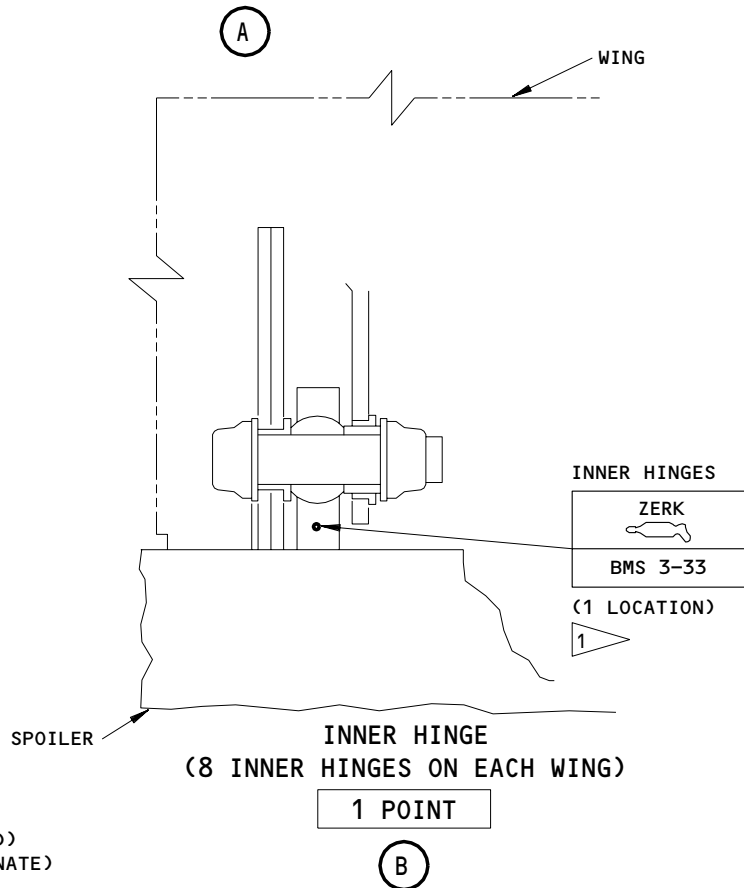
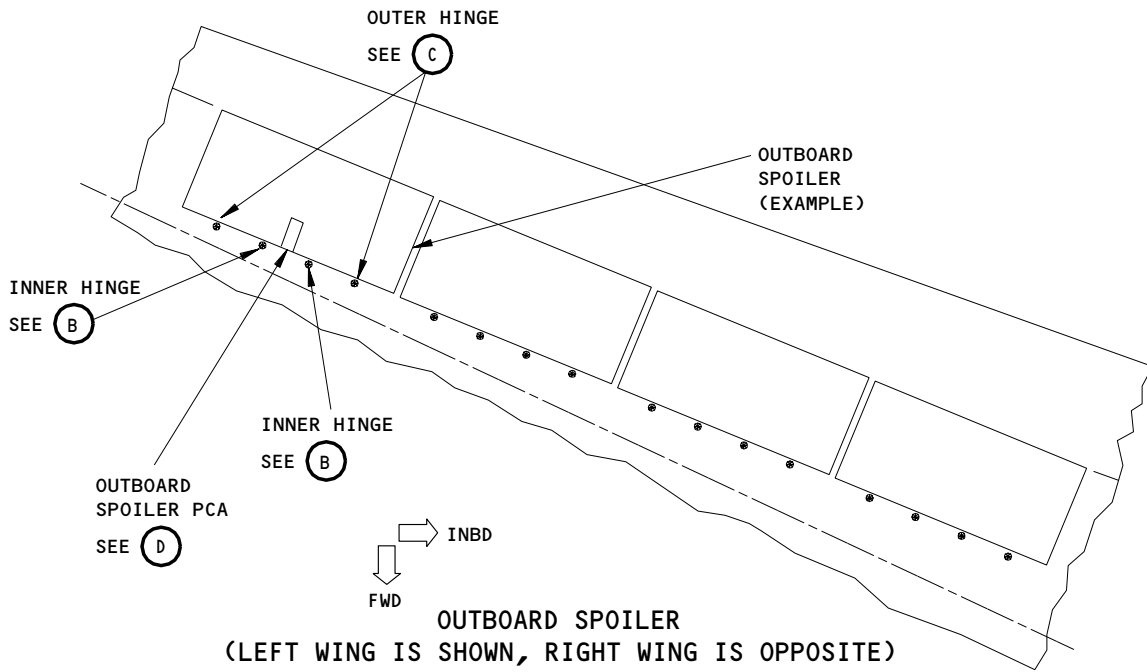
EFFECTIVITY	
	ALL

12-21-10

01

Page 307
May 10/91

588249



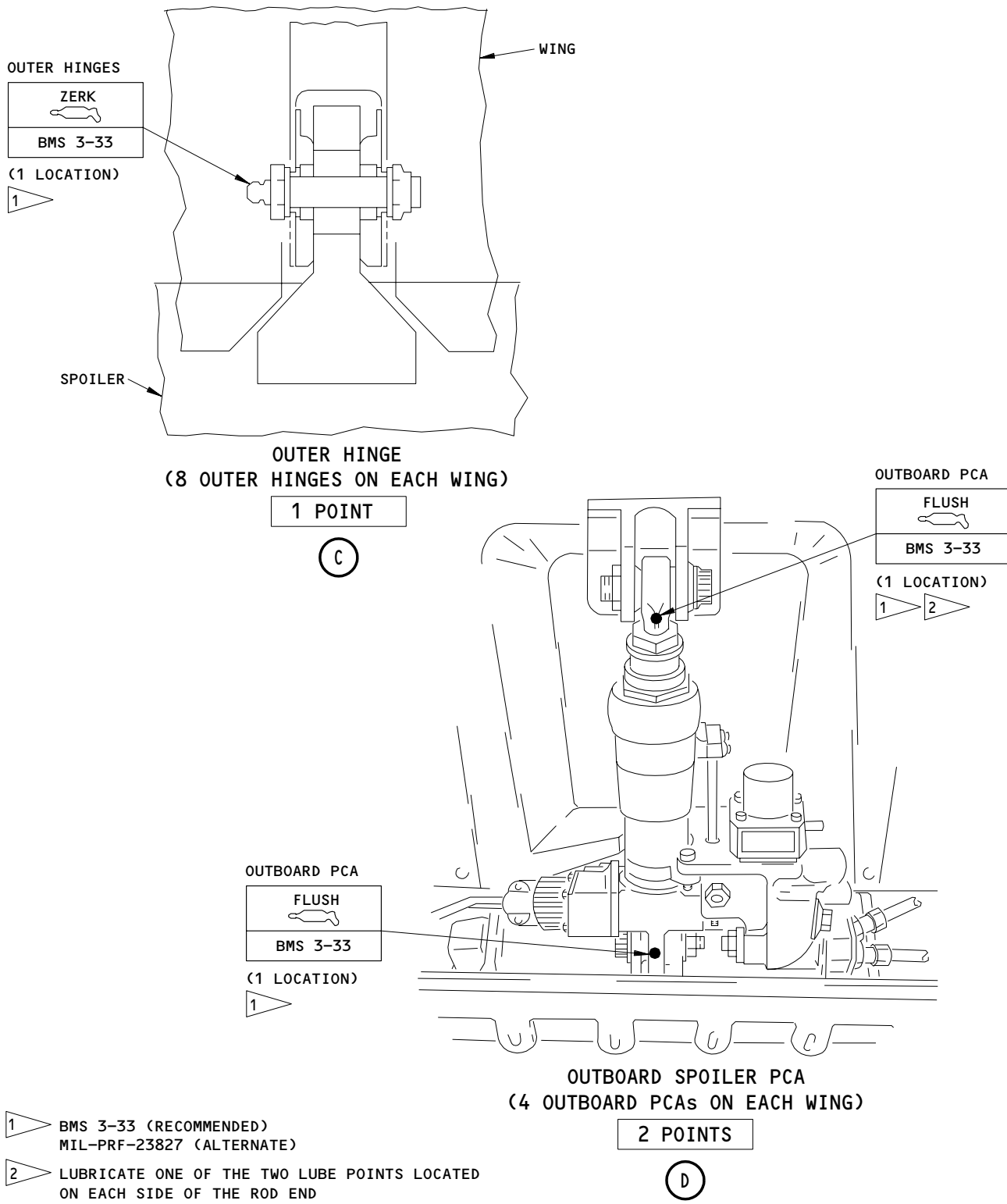
1 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Outboard Spoilers/Speedbrakes Servicing (Lubrication)
Figure 302 (Sheet 2)

EFFECTIVITY	ALL
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12-21-10

588265



- 1 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)
- 2 LUBRICATE ONE OF THE TWO LUBE POINTS LOCATED
ON EACH SIDE OF THE ROD END

**Outboard Spoilers/Speedbrakes Servicing (Lubrication)
Figure 302 (Sheet 3)**

EFFECTIVITY	
	ALL

12-21-10

588301

MAIN LANDING GEAR SUPPORT BEAM – SERVICING

1. General

- A. This procedure contains one task. This task lubricates the support beam, the support link and the side strut swivel assembly of the main landing gear.

TASK 12-21-11-603-007

2. Lubricate the Support Beam of the Main Landing Gear (Fig. 301, Fig. 302)

A. Consumable Materials

- (1) D00633 Grease – BMS 3-33 (Recommended)
(2) D00013 Grease – MIL-PRF-23827 (Alternative)

B. References

- (1) AMM 06-44-00/201, Access Doors and Panels
(2) AMM 20-30-04/201, Lubricants
(3) AMM 32-00-15/201, Landing Gear Door Locks
(4) AMM 32-00-20/201, Landing Gear Downlocks
(5) AMM 27-51-00/201, Trailing Edge Flap System

C. Access

- (1) Location Zones
143/144 Main Landing Gear Wheel Well
- (2) Access Panels
551XBX/651XBX Lower Wing Structure
552CB/652CB Landing Gear Support Beam

D. Prepare to Lubricate the Support Beam Assembly.

S 483-013

WARNING: MAKE SURE THE DOWNLOCKS ARE INSTALLED IN ALL OF THE GEAR. WITHOUT THE DOWNLOCKS, THE LANDING GEAR COULD RETRACT AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 493-002

WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 013-003

- (3) Open the access door or panel to access the outboard lube fitting on the aft side of the MLG Support Beam (AMM 06-44-00/201).

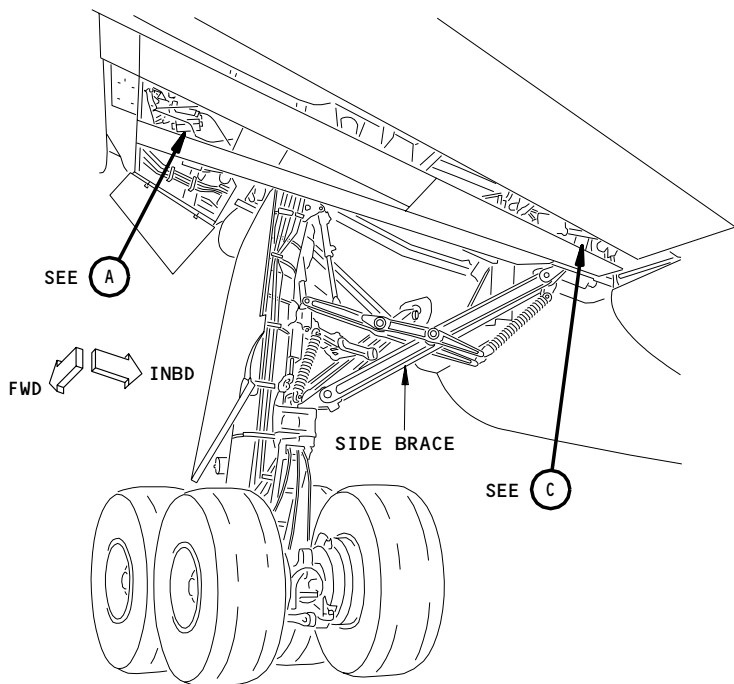
EFFECTIVITY

ALL

12-21-11

02

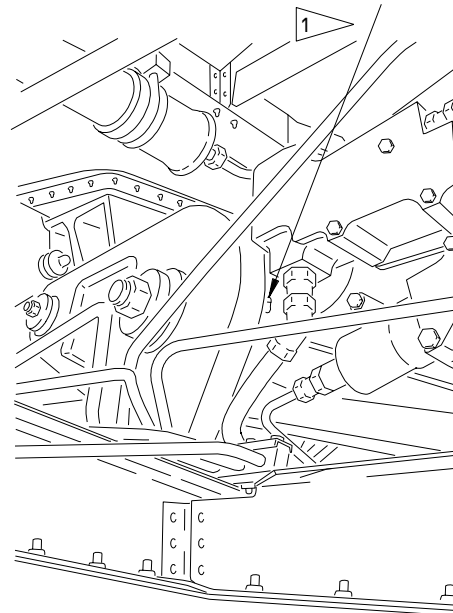
Page 301
Aug 22/08



MAIN LANDING
GEAR BEAM

ZERK
BMS 3-33

(1 LOCATION)



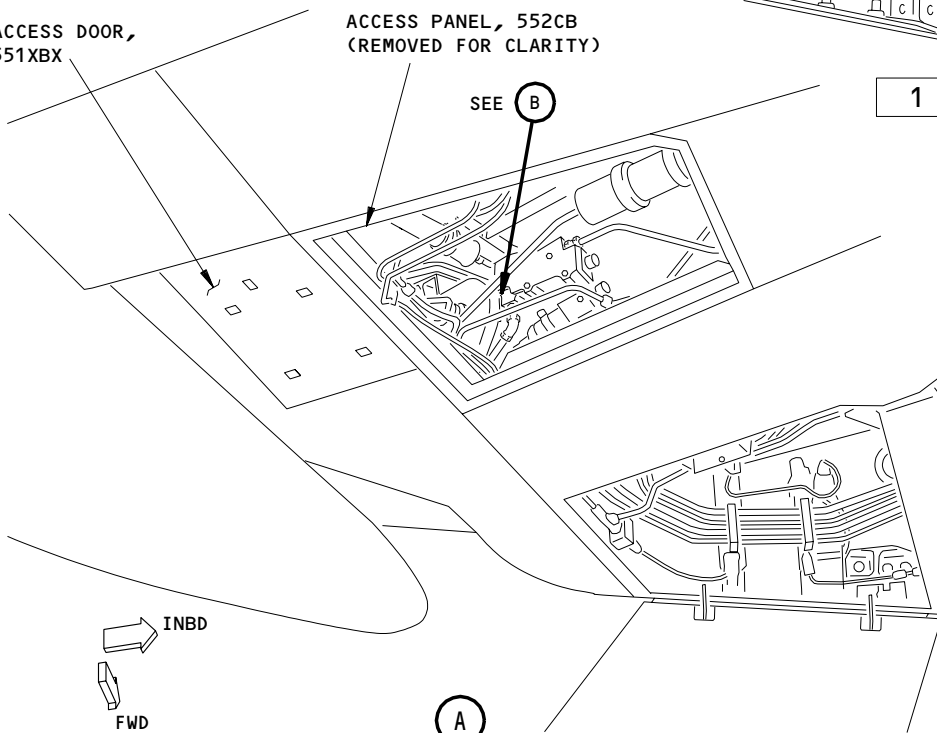
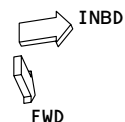
ACCESS DOOR,
551XBX

ACCESS PANEL, 552CB
(REMOVED FOR CLARITY)

SEE (B)

1 POINT

(B)



1 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Lubrication of the Support Beam Assembly for the Main Landing Gear
Figure 301 (Sheet 1)

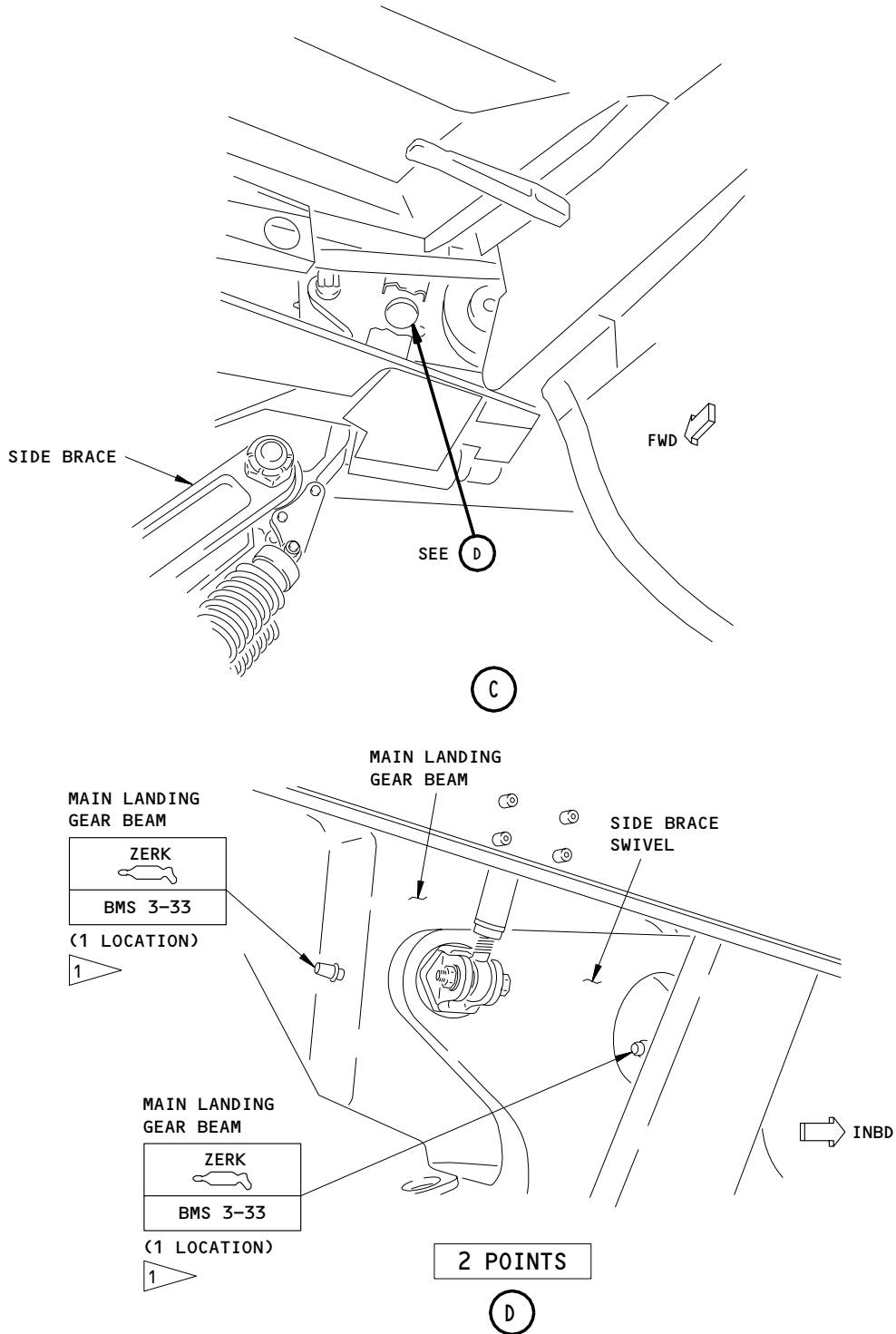
EFFECTIVITY

ALL

12-21-11

01

Page 302
Aug 22/03



1 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

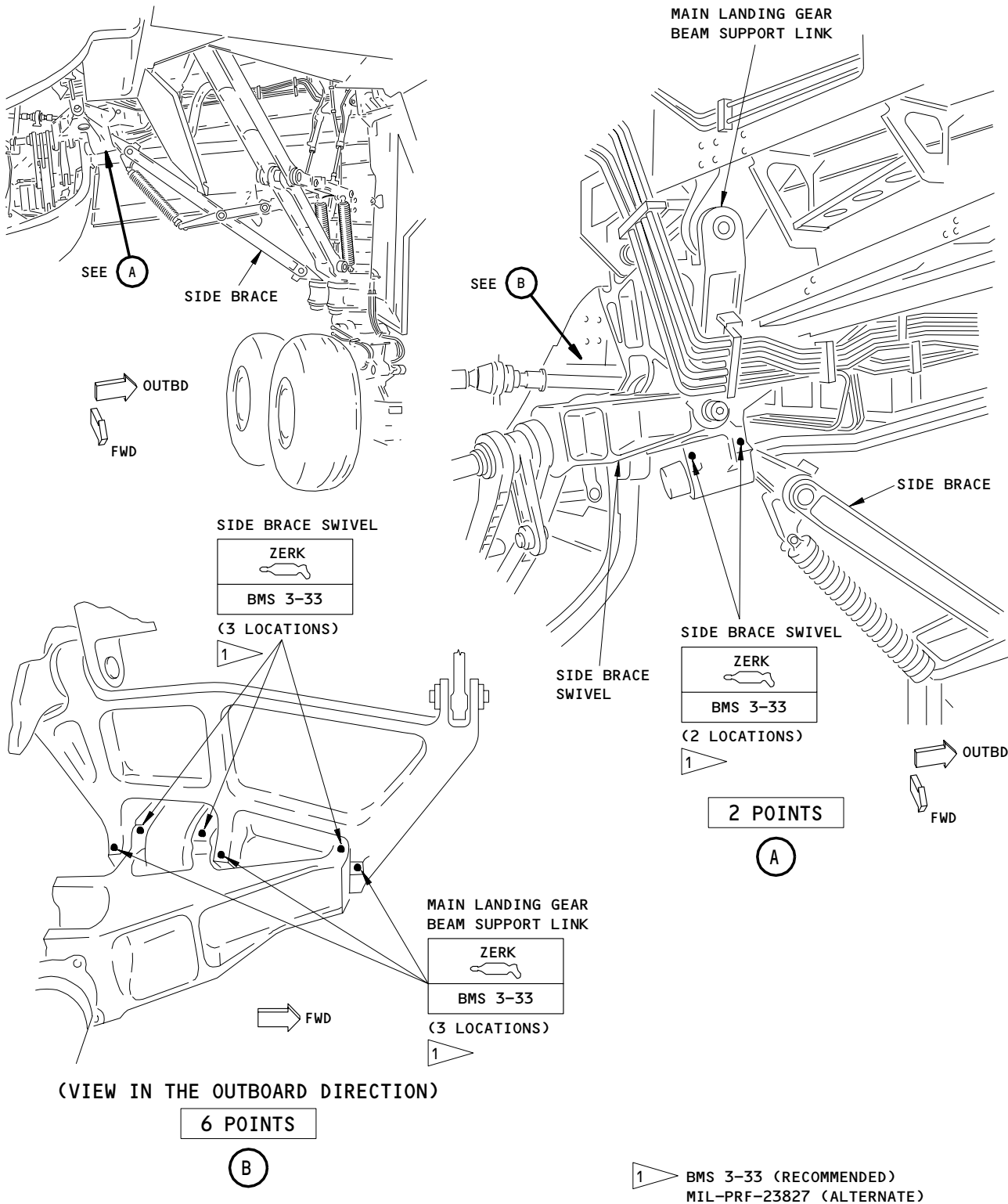
Lubrication of the Support Beam Assembly for the Main Landing Gear
Figure 301 (Sheet 2)

EFFECTIVITY	
	ALL

12-21-11

01

Page 303
Aug 22/03



Lubrication of the Side Brace Swivel and Support Link for the Main Landing Gear Beam
Figure 302

EFFECTIVITY

ALL

12-21-11

01

Page 304
Aug 22/03

S 983-015

- (4) Extend the flaps to access the inboard lube fittings on the aft side of the MLG Beam (AMM 27-51-00/201).

S 863-018

- (5) Deactivate the flaps (AMM 27-51-00/201).

E. Lubricate the Support Beam Assembly.

S 643-004

CAUTION: DO NOT USE MORE THAN 2500 PSI OF PRESSURE WHEN YOU LUBRICATE THE SUPPORT BEAM OF THE MAIN LANDING GEAR. A PRESSURE MORE THAN 2500 PSI CAN CAUSE THE LUBRICATION FITTING TO BLOW OUT.

CAUTION: BE CAREFUL WHEN YOU DISENGAGE THE GREASE GUN FROM THE LUBRICATION FITTING. THE GREASE GUN CAN CAUSE DAMAGE TO THE FITTING.

- (1) Lubricate the MLG support beam in three locations (Fig. 301).

S 643-006

- (2) Lubricate the side brace swivel in five locations (Fig. 302).

S 643-007

- (3) Lubricate the MLG beam support link in three locations (Fig. 302).

F. Put the Airplane Back to Its Usual Condition.

S 863-019

- (1) Activate the flaps (AMM 27-51-00/201).

S 983-016

- (2) Retract the flaps (AMM 27-51-00/201).

S 413-005

- (3) Close the access doors (AMM 06-44-00/201).

S 083-014

WARNING: OBEY THE REMOVAL PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (4) Remove the door locks and close the doors (AMM 32-00-15/201).

EFFECTIVITY

ALL

12-21-11

02

Page 305
Apr 22/08

NOSE GEAR AND ACTUATING MECHANISMS – LUBRICATION

1. General

- A. This procedure gives the instructions to lubricate the nose landing gear and the actuating mechanisms.

TASK 12-21-12-603-001

2. Lubricate the Nose Landing Gear and the Actuating Mechanisms

A. Consumable Materials

- (1) D00633 Grease – BMS 3-33 (Preferred)
(2) D00013 Grease – MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)

B. References

- (1) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

(1) Location Zones

- | | |
|---------|--|
| 711 | Nose Landing Gear (NLG) |
| 713/714 | Forward Doors of the Nose Landing Gear |

D. Prepare to Lubricate the Nose Landing Gear and the Actuating Mechanisms.

S 493-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 033-008

- (2) STEERING DRUM BEARINGS WITHOUT SB 32-0166;
Remove steering drum and lockout cam cover (Fig. 301, View C).

E. Lubricate the Nose Landing Gear and the Actuating Mechanisms.

S 013-003

- (1) To open the forward doors of the nose landing gear, release the lock on the rod 2 of the operating mechanism.

EFFECTIVITY

ALL

12-21-12

02

Page 301
Aug 22/07

S 643-004

CAUTION: DO NOT USE A PRESSURE OF MORE THAN 2500 PSI WHEN YOU LUBRICATE THE NOSE LANDING GEAR. A PRESSURE MORE THAN 2500 PSI CAN CAUSE THE LUBRICATION FITTING TO BLOW OFF.

- (2) If a fitting does blow off, do the steps that follow:
- (a) Make sure there is not a blockage or unwanted material in the lubrication path.
 - (b) Install a new lubrication fitting (AMM 20-10-29/401).

S 643-005

CAUTION: BE CAREFUL WHEN YOU DISENGAGE THE GREASE GUN FROM THE LUBRICATION FITTING. THE GREASE GUN CAN CAUSE DAMAGE TO THE FITTING.

CAUTION: DO NOT USE THE METERING VALVE MODULE AS A STEP WHEN YOU LUBRICATE THE NOSE LANDING GEAR. IF YOU USE THE VALVE AS A STEP, YOU CAN CAUSE DAMAGE TO THE COMPENSATOR OF THE METERING VALVE.

CAUTION: FOR LUBRICATION OF THE BEARINGS ON THE NWS ACTUATOR TRUNNION USE A MANUAL GREASE GUN OR RESTRICT THE FLOW RATE TO 0.65 LB/MIN MAXIMUM. THIS WILL PREVENT POSSIBLE BEARING SEAL DAMAGE.

- (3) Lubricate the nose landing gear as shown (Fig. 301).
F. Put the Airplane Back to Its Usual Condition.

S 413-006

- (1) Manually close the forward doors of the nose landing gear.

EFFECTIVITY

ALL

12-21-12

01

Page 302
Nov 10/97

- S 433-010
- (2) STEERING DRUM BEARINGS WITHOUT SB 32-0166;
Install the steering drum and lockout cam cover (Fig. 301, View C).

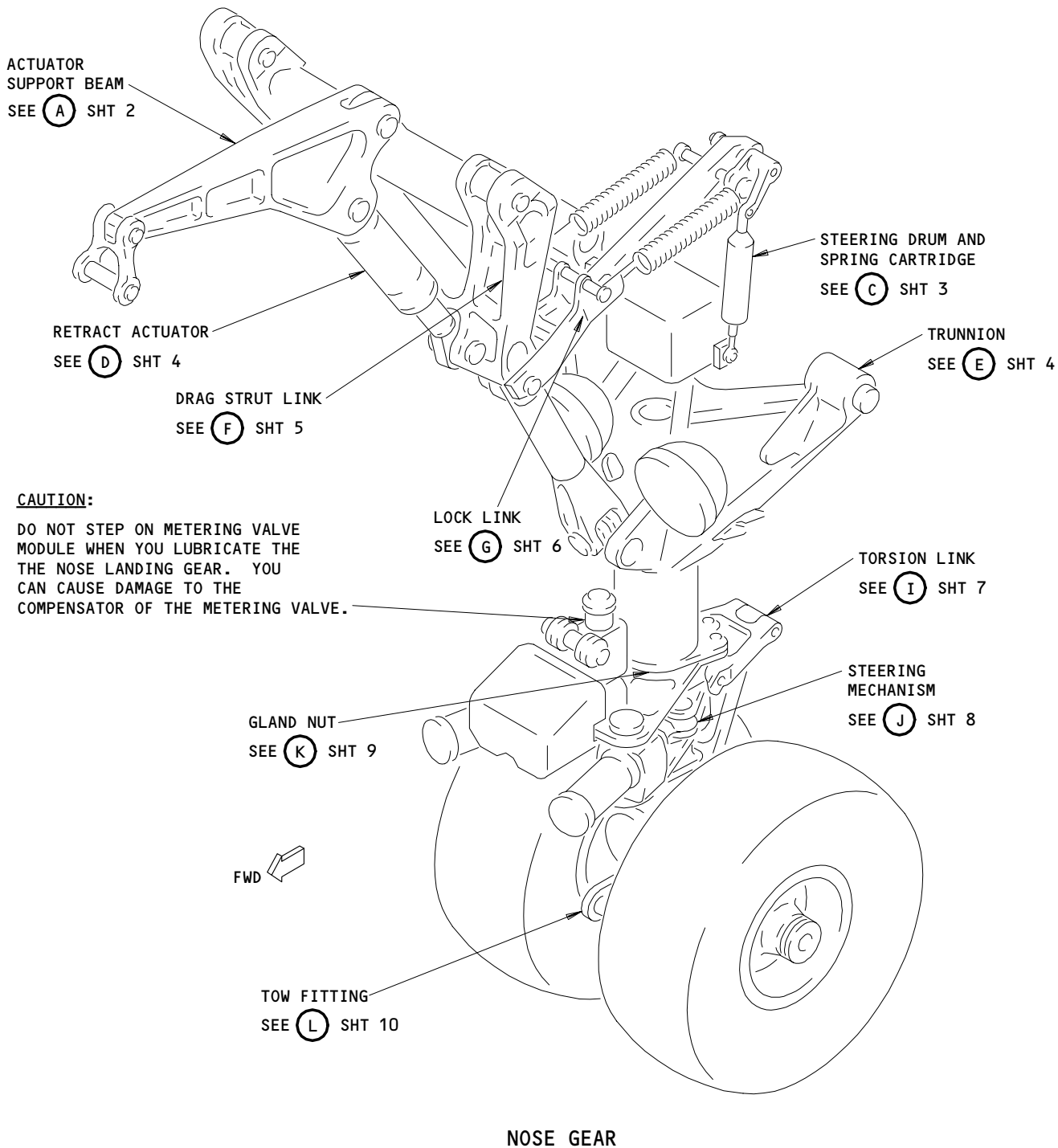
EFFECTIVITY

ALL

12-21-12

01

Page 303
Apr 22/00



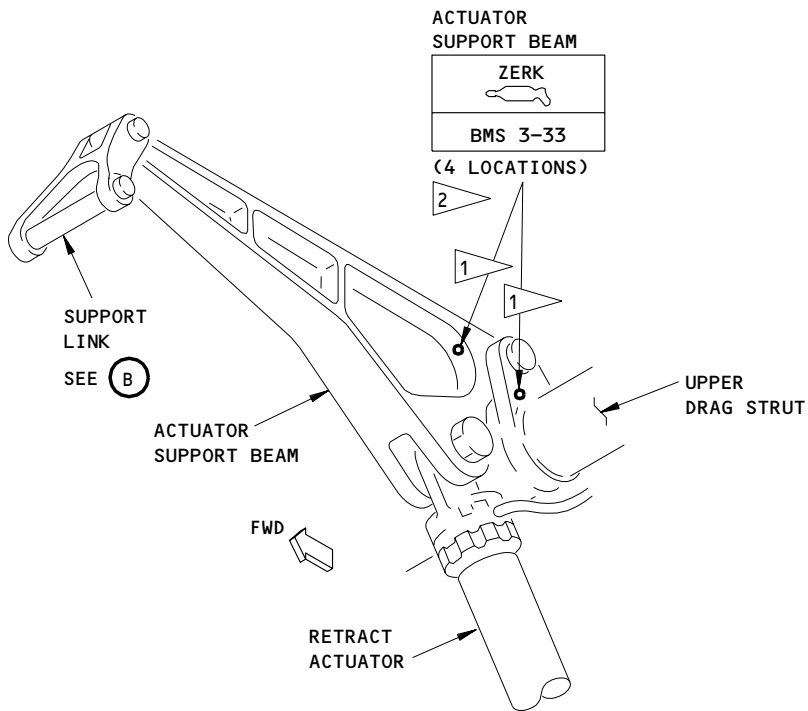
Lubrication of the Actuating Mechanism and the Nose Landing Gear
Figure 301 (Sheet 1)

EFFECTIVITY	
	ALL

12-21-12

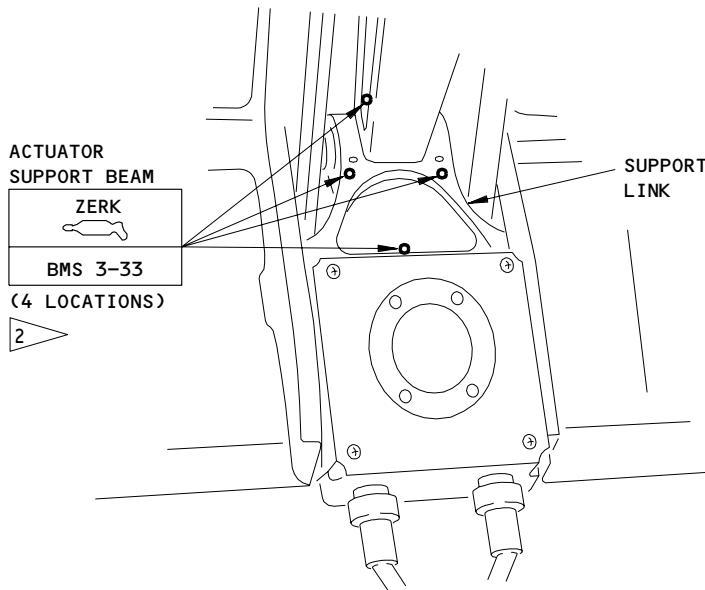
01

Page 304
Nov 10/97



4 POINTS

(A)



(VIEW IN THE FORWARD DIRECTION)

4 POINTS

(B)

- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN)
- 2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

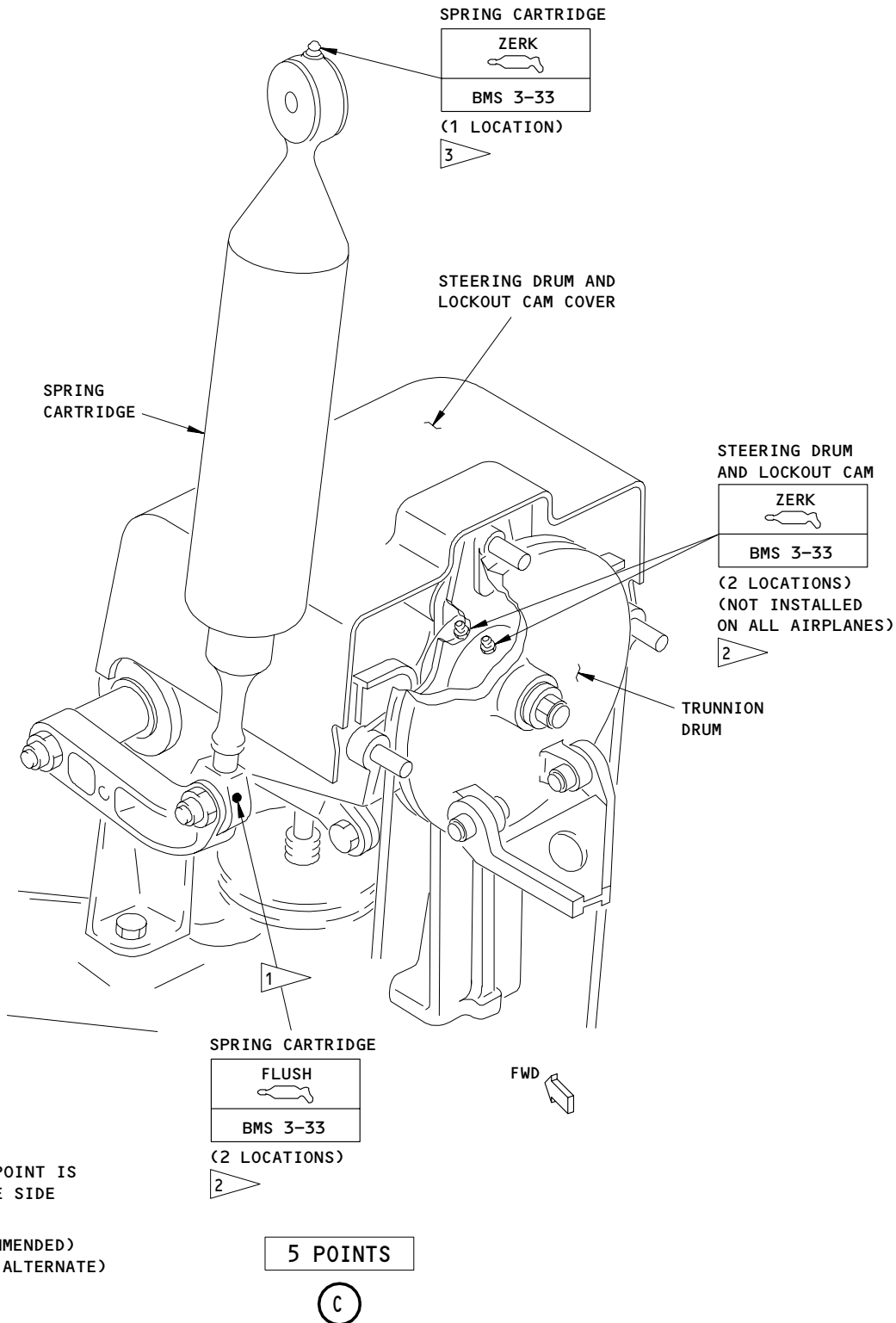
Lubrication of the Actuating Mechanisms and the Nose Landing Gear
Figure 301 (Sheet 2)

EFFECTIVITY	ALL
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12-21-12

01

Page 305
Aug 22/03

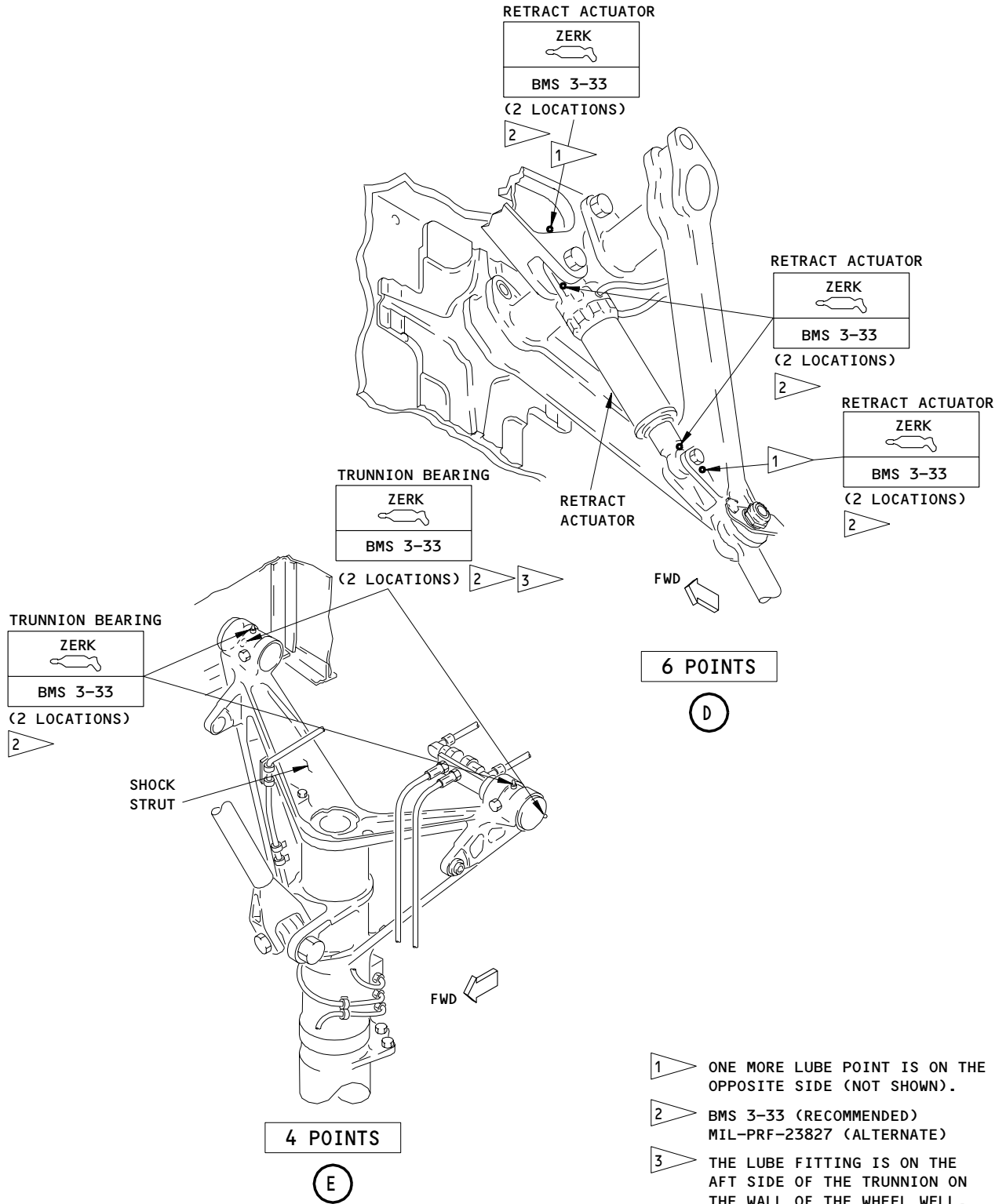


- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN)
- 2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)
- 3 IF INSTALLED

**Lubrication of the Actuating Mechanisms and the Nose Landing Gear
Figure 301 (Sheet 3)**

EFFECTIVITY	
	ALL

12-21-12



Lubrication of the Actuating Mechanisms and the Nose Landing Gear
Figure 301 (Sheet 4)

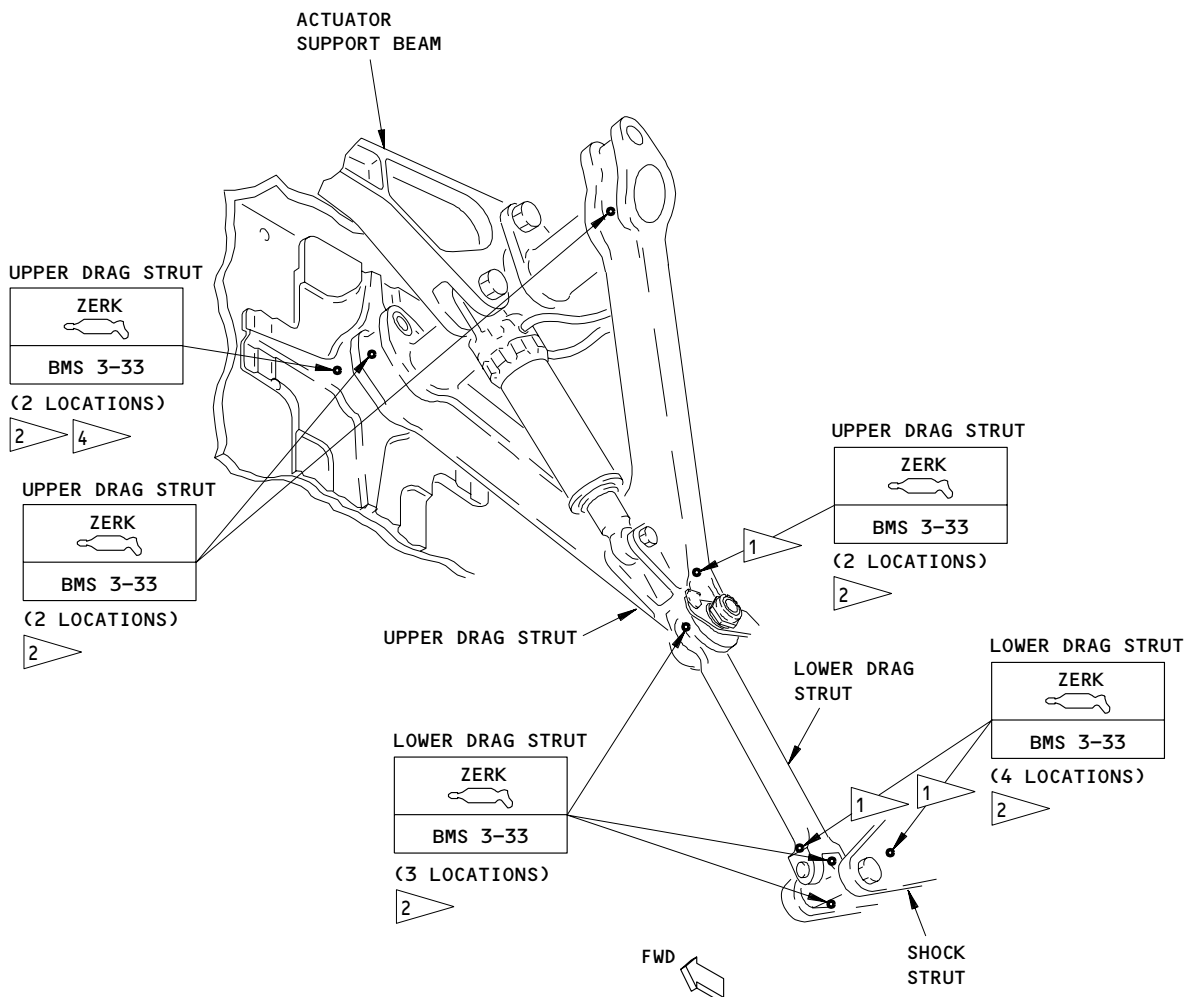
EFFECTIVITY

ALL

12-21-12

01

Page 307
Aug 22/03



13 POINTS

F

- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN).
- 2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)
- 4 THE RIGHT SIDE LUBE FITTING IS SHOWN (THE LEFT SIDE IS THE SAME).

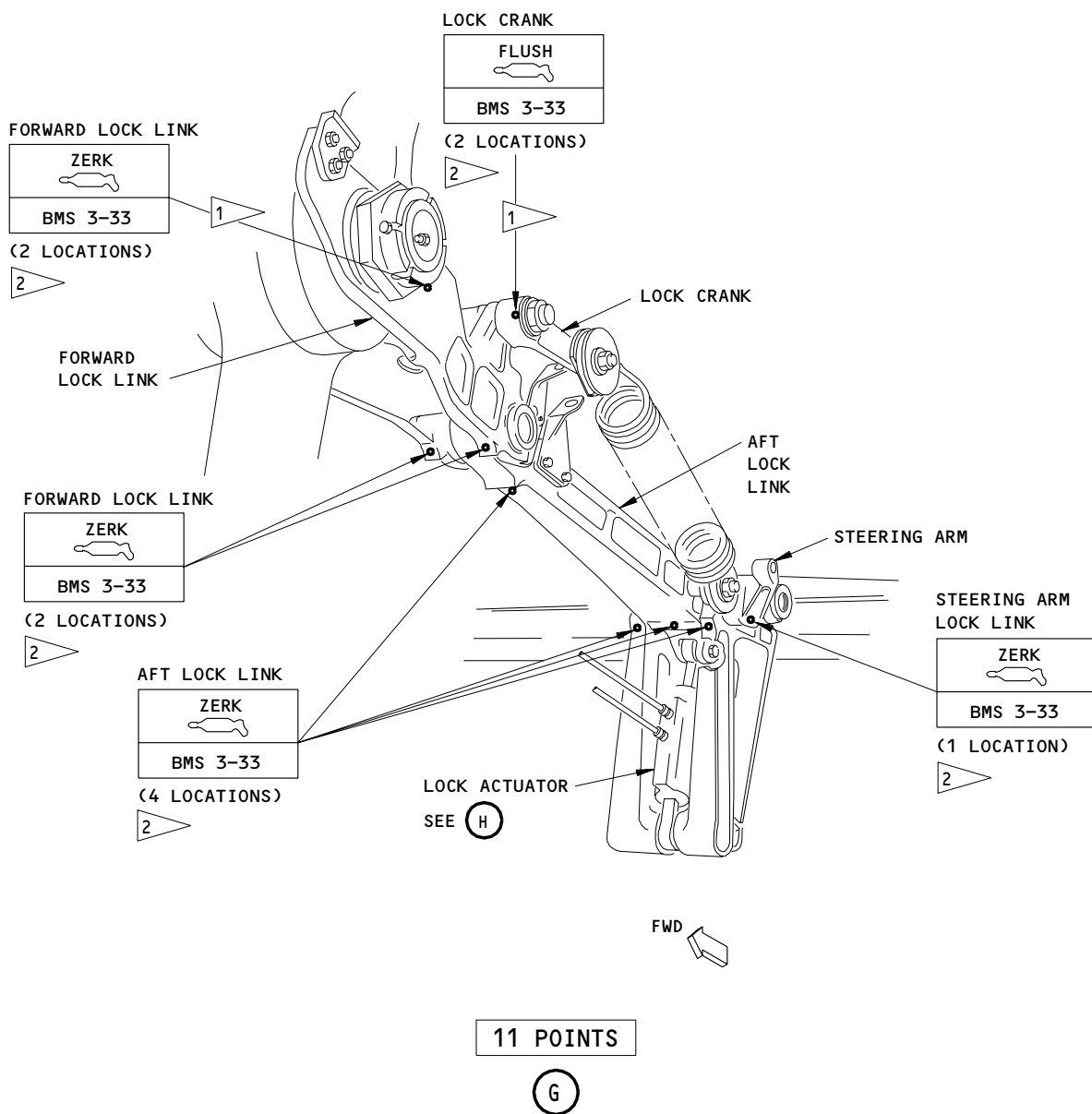
Lubrication of the Actuating Mechanisms and the Nose Landing Gear
Figure 301 (Sheet 5)

EFFECTIVITY	ALL
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12-21-12

01

Page 308
Aug 22/03



- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN).
- 2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Lubrication of the Actuating Mechanisms and the Nose Landing Gear
Figure 301 (Sheet 6)

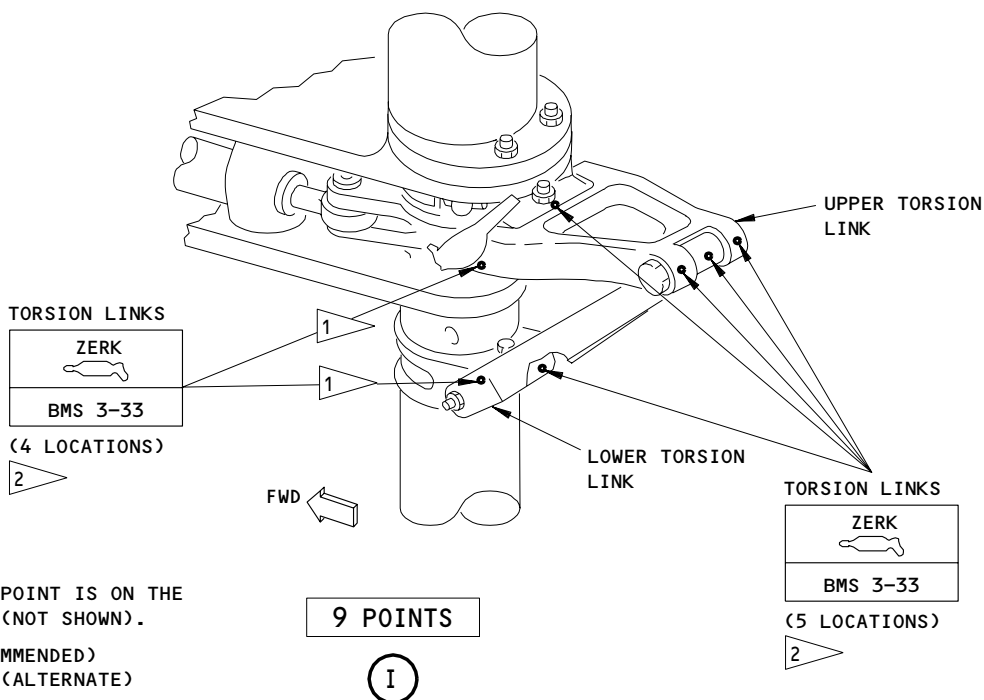
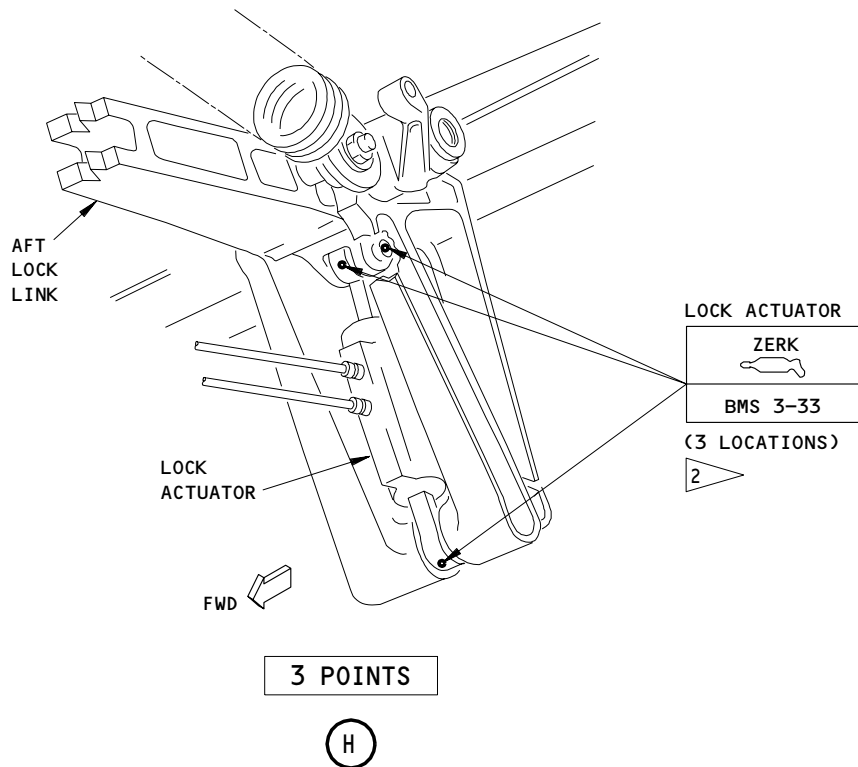
EFFECTIVITY

ALL

12-21-12

01

Page 309
Aug 22/03

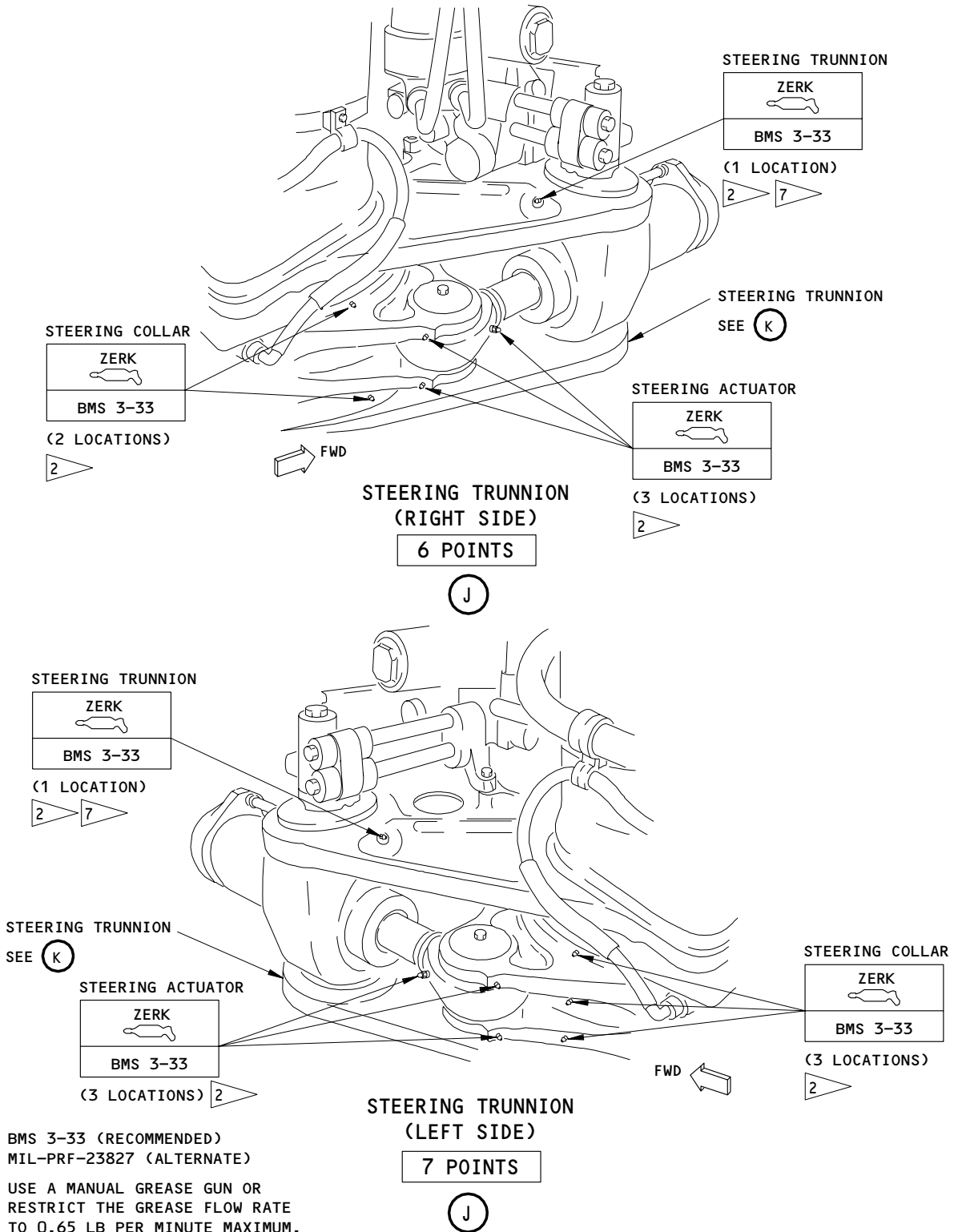


- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN).
- 2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Lubrication of the Actuating Mechanisms and the Nose Landing Gear
Figure 301 (Sheet 7)

EFFECTIVITY	
ALL	

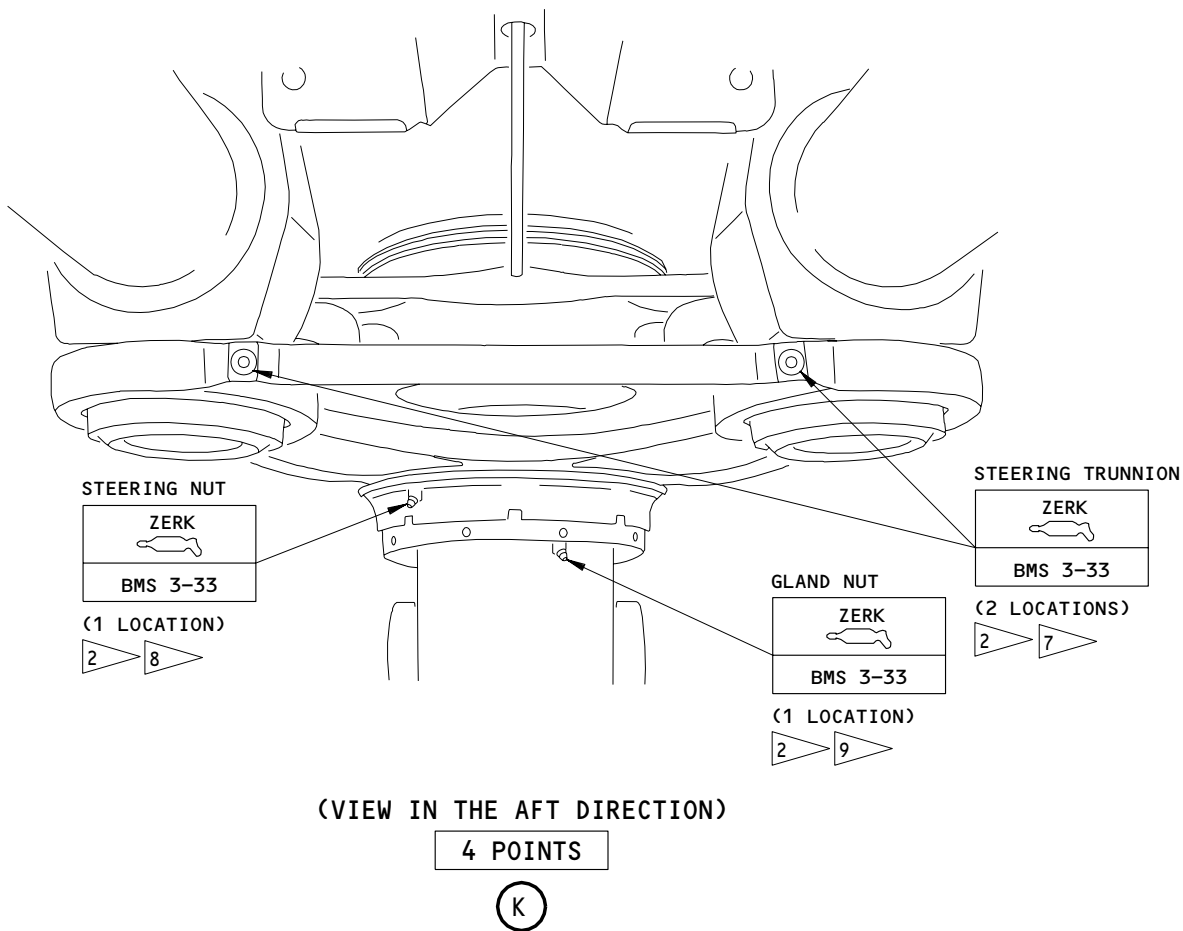
12-21-12



Lubrication of the Actuating Mechanisms and the Nose Landing Gear
Figure 301 (Sheet 8)

EFFECTIVITY	ALL
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12-21-12



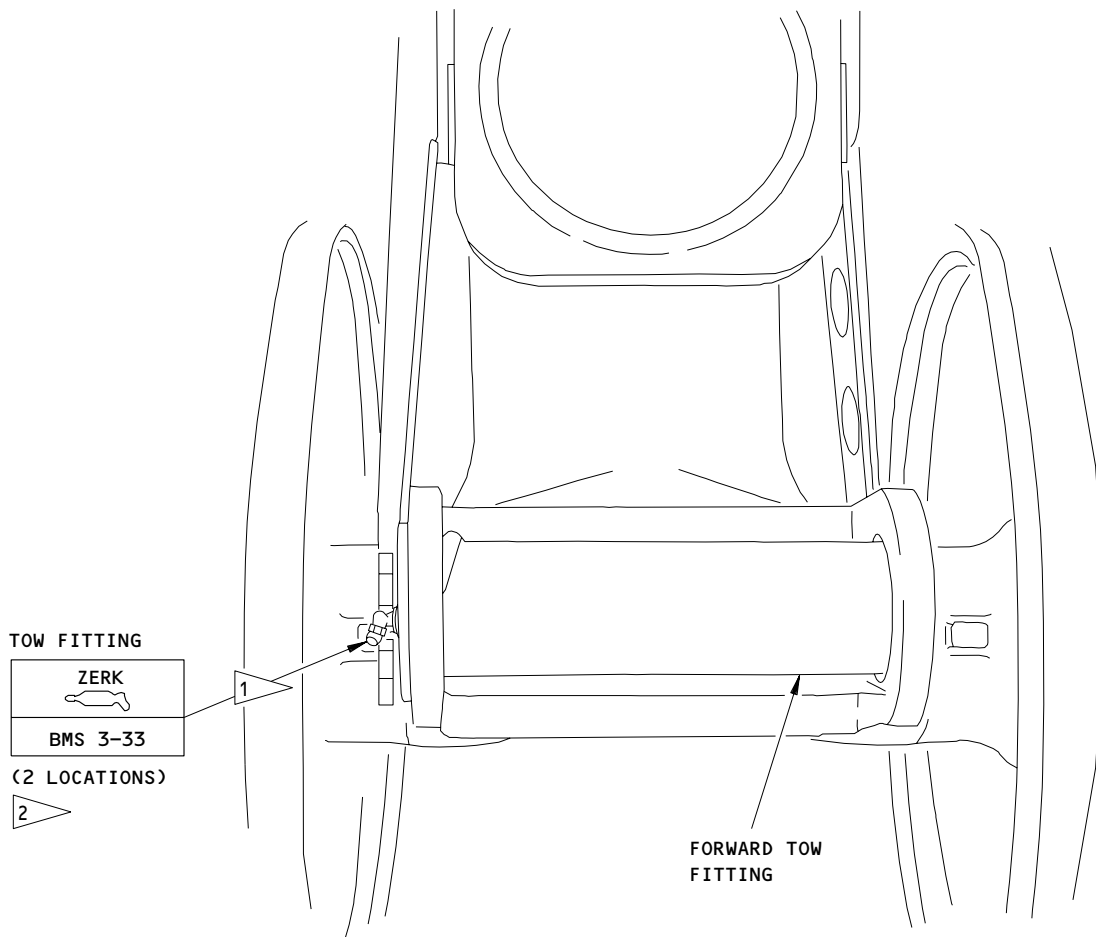
- 2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)
- 7 USE A MANUAL GREASE GUN OR RESTRICT THE GREASE FLOW RATE TO 0.65 LB PER MINUTE MAXIMUM
- 8 THE POSITION OF THE LUBE FITTINGS CHANGE AROUND THE CYLINDER OF THE SHOCK STRUT
- 9 ON GLAND NUTS WITH A LUBE FITTING; THE POSITION OF THE LUBE FITTING CHANGES AROUND THE CYLINDER OF THE SHOCK STRUT. SOME GLAND NUTS DO NOT HAVE A LUBE FITTING INSTALLED.

CAUTION: DO NOT OVER LUBRICATE THE GLAND NUT. USE MINIMUM PRESSURE ON THE HANDPUMP TO APPLY THE GREASE. APPLY THE EQUIVALENT OF 3-5 PUMPS OF A MEDIUM SIZE GREASE GUN. OVER LUBRICATION OR EXCESSIVE LUBE PRESSURE CAN CAUSE DAMAGE TO THE SCRAPER RING AND/OR SEALS.

Lubrication of the Actuating Mechanism and the Nose Landing gear
Figure 301 (Sheet 9)

EFFECTIVITY	ALL
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12-21-12



(VIEW IN THE AFT DIRECTION)

2 POINTS

(L)

- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN).
- 2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Lubrication of the Actuating Mechanisms and the Nose Landing Gear
Figure 301 (Sheet 10)

EFFECTIVITY

ALL

12-21-12

01

Page 313
Aug 22/03

NOSE GEAR DOORS AND OPERATING MECHANISMS – SERVICING

1. General

- A. This procedure contains the task to lubricate the doors and the operating mechanisms for the nose landing gear.

TASK 12-21-13-603-001

2. Lubricate the Doors and the Operating Mechanisms of the Nose Landing Gear

A. Consumable Materials

- (1) D00633 Grease – BMS 3-33 (Preferred)
(2) D00013 Grease – MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)

B. References

- (1) AMM 32-00-20/201, Landing Gear Downlocks

C. Access

(1) Location Zones

711	Nose Landing Gear (NLG)
713/714	NLG Forward Doors
715/716	NLG Aft Doors

D. Prepare to Lubricate the Doors and the Operating Mechanisms.

S 493-002

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

E. Lubricate the Doors and the Operating Mechanisms of the Nose Landing Gear.

S 013-003

- (1) To open the forward doors of the nose landing gear, release the lock on rod 2 of the operating mechanisms.

S 643-004

CAUTION: BE CAREFUL WHEN YOU DISENGAGE THE GREASE GUN FROM THE LUBRICATION FITTING. THE GREASE GUN CAN CAUSE DAMAGE TO THE FITTING.

- (2) Lubricate the doors and the operating mechanisms of the nose landing gear (Fig. 301).

EFFECTIVITY

ALL

12-21-13

01

Page 301
Aug 22/07

F. Put the Airplane Back to Its Usual Condition.

S 413-005

- (1) Manually close the forward doors of the nose landing gear.

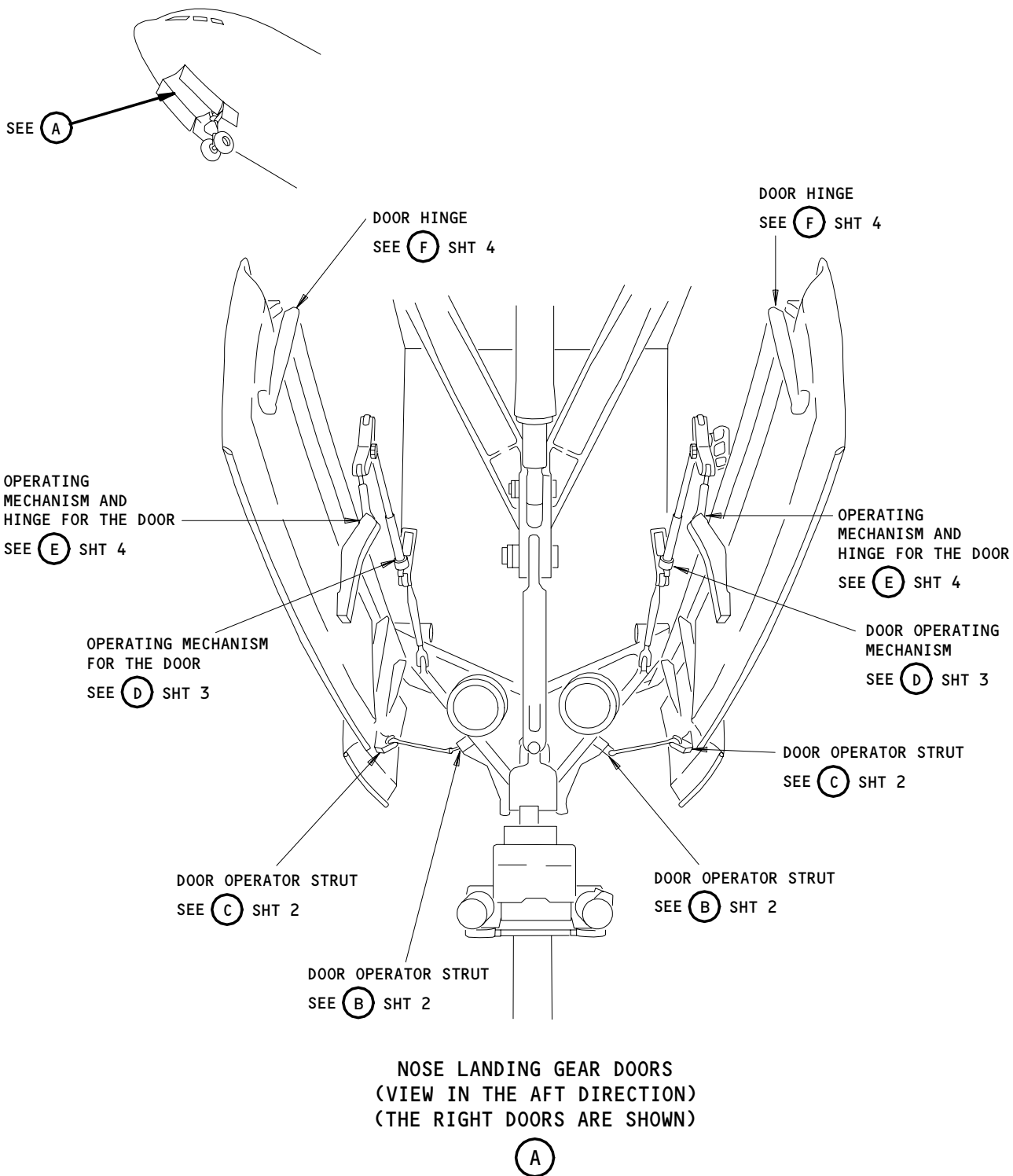
EFFECTIVITY

ALL

12-21-13

01

Page 302
Aug 10/90



Lubrication of the Doors and Operating Mechanisms for the Nose Landing Gear
Figure 301 (Sheet 1)

EFFECTIVITY

ALL

12-21-13

01

Page 303
Aug 10/90

DOOR OPERATOR STRUT

ZERK
BMS 3-33

(3 LOCATIONS)

1

DOOR OPERATOR STRUT

SHOCK STRUT FOR THE NOSE LANDING GEAR



THE RIGHT DOOR IS SHOWN

3 POINTS

(B)

DOOR OPERATOR STRUT

ZERK
BMS 3-33

(2 LOCATIONS)

1

AFT DOOR

AFT

THE RIGHT DOOR IS SHOWN

2 POINTS

(C)

1 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Lubrication of the Doors and Operating Mechanisms for the Nose Landing Gear
Figure 301 (Sheet 2)

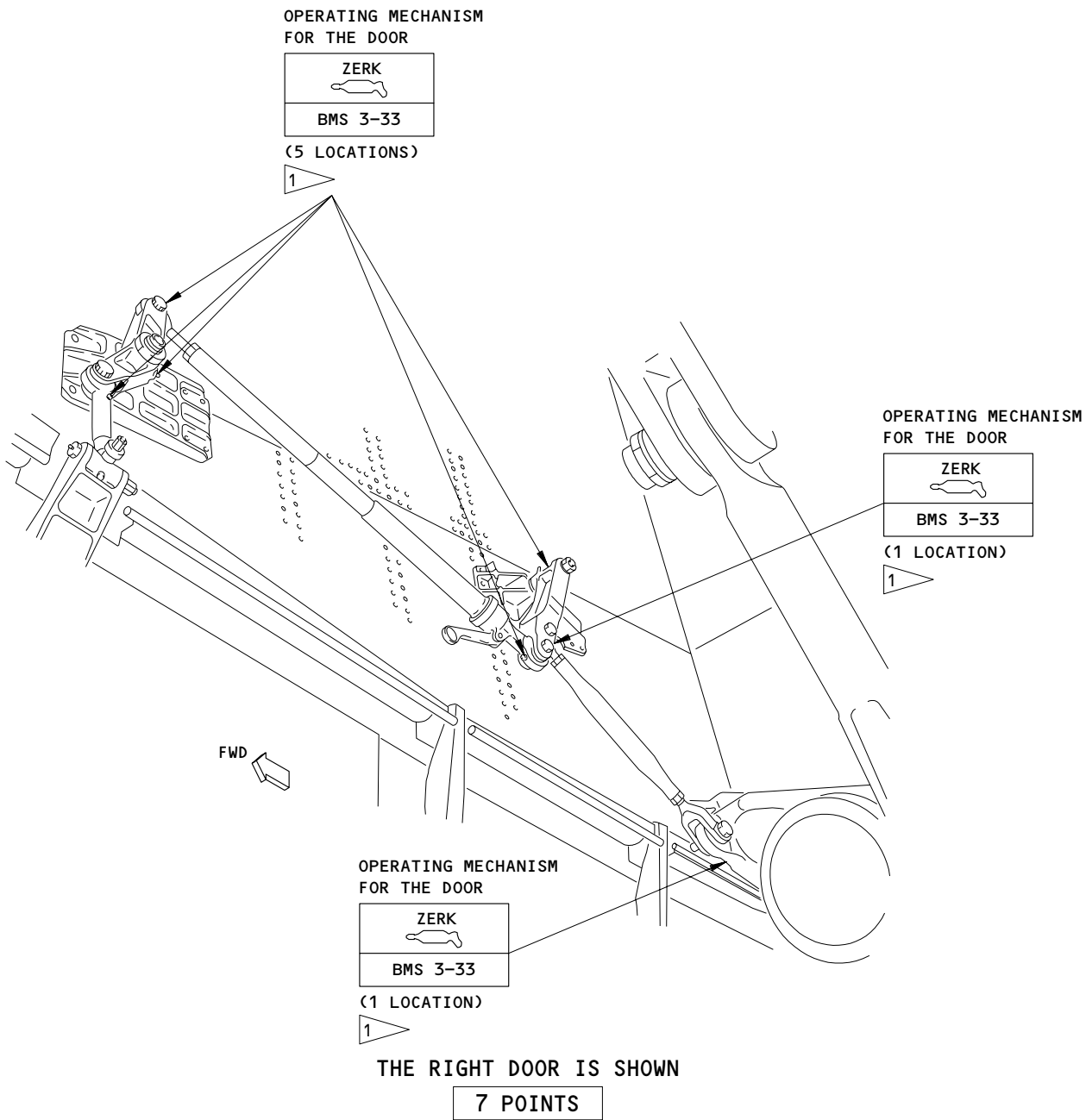
EFFECTIVITY

ALL

12-21-13

01

Page 304
Apr 22/04



1 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

(D)

Lubrication of the Doors and Operating Mechanisms for the Nose Landing Gear
Figure 301 (Sheet 3)

EFFECTIVITY	ALL
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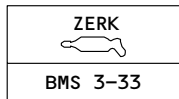
12-21-13

01

Page 305
Aug 22/03

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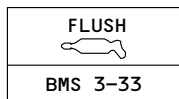
OPERATING MECHANISM
FOR THE DOOR



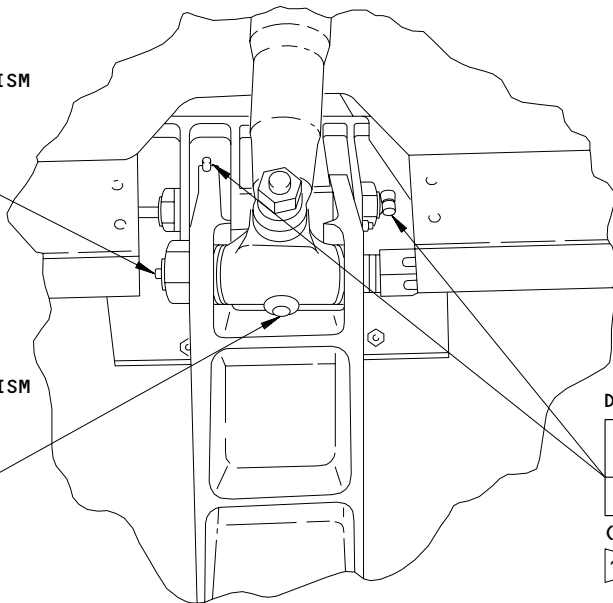
(1 LOCATION)



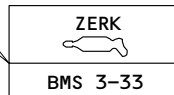
OPERATING MECHANISM
FOR THE DOOR



(1 LOCATION)



DOOR HINGE



(2 LOCATIONS)

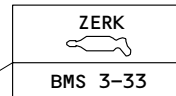


THE RIGHT DOOR IS SHOWN

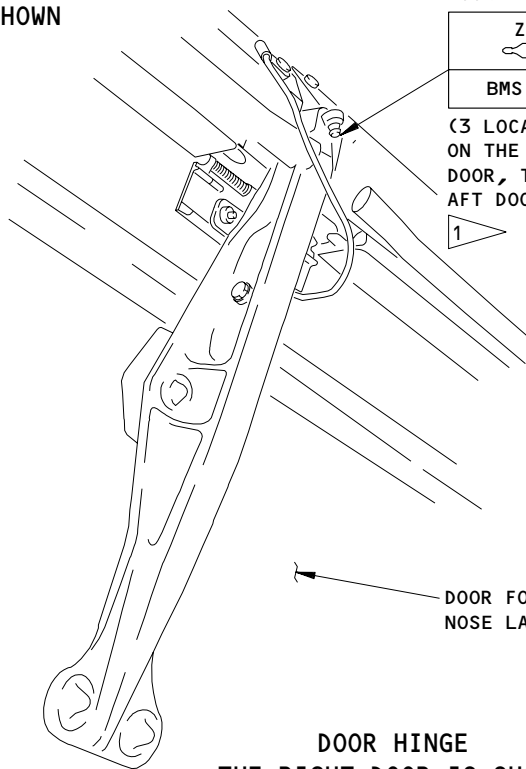
4 POINTS



DOOR HINGE



(3 LOCATIONS, ONE
ON THE FORWARD
DOOR, TWO ON THE
AFT DOOR)



DOOR FOR THE
NOSE LANDING GEAR

DOOR HINGE
THE RIGHT DOOR IS SHOWN

1 POINT



1 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Lubrication of the Doors and Operating Mechanisms for the Nose Landing Gear
Figure 301 (Sheet 4)

EFFECTIVITY

ALL

12-21-13

01

Page 306
Aug 22/03

MAIN GEAR AND ACTUATING MECHANISMS – SERVICING

1. General

- A. This procedure contains the task to lubricate the main landing gear and the actuating mechanisms.

TASK 12-21-14-603-001

2. Lubricate the Main Landing Gear and the Actuation Mechanisms

(Fig. 301, 302, 303)

A. Equipment

- (1) Main Landing Gear Door Lock - A32030-6 or -12 or -18 or -21

B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
 (2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
 (3) Deleted.
 (4) D00528 Grease - Royco 11-MS or Aeroshell Grease 11-MS
 (5) G00009 Rust Inhibitor - LPS-3,
 BMS 3-23 TYPE II (Recommended)
 (6) C00755 Corrosion Inhibiting Compound -
 Dinitrol AV-25, BMS 3-26 Type I (Alternative)

C. References

- (1) AMM 06-44-00/201, Access Door and Panels
 (2) AMM 32-00-15/201, Landing Gear Door Locks
 (3) AMM 32-00-20/201, Landing Gear Downlocks

D. Access

(1) Location Zones

- | | |
|---------|---|
| 551/651 | Rear Spar to Main Landing Gear Support Beam |
| 730/740 | Main Landing Gear and Doors |

(2) SAS 050-051, 150-156, 162-166, 275-276 WITHOUT SB 57-31;

Access Panels

- | | |
|-------------|---------------------------|
| 551QB/651QB | Lower Wing Structure |
| 552BB/652BB | Landing Gear Support Beam |

(3) SAS 050-051, 150-156, 162-166, 275-276 WITH SB 57-31,
 SAS 167, 277-281;

Access Panels

- | | |
|-------------|---------------------------|
| 552BB/652BB | Landing Gear Support Beam |
|-------------|---------------------------|

EFFECTIVITY

ALL

12-21-14

E. Prepare to Lubricate the Main Landing Gear and the Actuation Mechanisms.

S 483-040

WARNING: MAKE SURE THE DOWNLOCKS ARE INSTALLED IN ALL OF THE GEAR. WITHOUT THE DOWNLOCKS, THE LANDING GEAR COULD RETRACT AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 483-045

WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

S 013-004

- (3) Open the access panels 551FT/651FT (AMM 06-44-00/201).

F. Lubricate the Main Landing Gear and the Actuation Mechanisms.

S 643-005

CAUTION: DO NOT USE A PRESSURE OF MORE THAN 2500 PSI WHEN YOU LUBRICATE THE MAIN LANDING GEAR. A PRESSURE OF MORE THAN 2500 PSI CAN CAUSE THE LUBRICATION FITTING TO BLOW OFF.

- (1) If the lubrication fitting blows off, do the steps that follow:
 - (a) Make sure there is not a blockage or unwanted material in the lubrication path.
 - (b) Install a new lubrication fitting.

S 643-006

CAUTION: BE CAREFUL WHEN YOU DISENGAGE THE GREASE GUN FROM THE LUBRICATION FITTING. THE GREASE GUN CAN CAUSE DAMAGE TO THE FITTING.

- (2) Lubricate the main landing gear and the actuating mechanism.

G. Put the Airplane Back to Its Usual Condition.

S 413-007

- (1) Close the access panels 551FT/651FT (AMM 06-44-00/201).

EFFECTIVITY

ALL

12-21-14

01

Page 302
Aug 22/08

S 083-044

WARNING: OBEY THE REMOVAL PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(2) Remove the door locks and close the doors (AMM 32-00-15/201).

TASK 12-21-14-603-021

3. Lubricate the Aft Trunnion Bushing on the Main Landing Gear (Fig. 302)

A. Equipment

(1) Main Landing Gear Door Lock - A32030-6 or -12 or -18 or -21

B. Consumable Materials

(1) G50136 Corrosion Inhibiting Compound - BMS 3-38
(Recommended)

(2) C00913 Corrosion Inhibiting Compound - BMS 3-27 (Alternate)

NOTE: Desoto 823E508 (Titanine JC5A) is not an acceptable BMS 3-27 product (SB 767-32A0148).

C. References

(1) AMM 06-44-00/201, Access Door and Panels

(2) AMM 32-00-15/201, Landing Gear Door Locks

(3) AMM 32-00-20/201, Landing Gear Downlocks

D. Access

(1) Location Zones

551/651 Rear Spar to Main Landing Gear Support Beam
730/740 Main Landing Gear and Doors

E. Prepare to Lubricate the Aft Trunnion Bushing on the Main Landing Gear.

S 483-041

WARNING: MAKE SURE THE DOWNLOCKS ARE INSTALLED IN ALL OF THE GEAR. WITHOUT THE DOWNLOCKS, THE LANDING GEAR COULD RETRACT AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 483-046

WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

F. Lubricate the Aft Trunnion Bushing on the Main Landing Gear (Fig. 302)

EFFECTIVITY

ALL

12-21-14

13

Page 303
Aug 22/06

S 213-024

CAUTION: DO NOT USE A PRESSURE OF MORE THAN 2500 PSI WHEN YOU LUBRICATE THE MAIN LANDING GEAR. A PRESSURE OF MORE THAN 2500 PSI CAN CAUSE THE LUBRICATION FITTING TO BLOW OFF.

- (1) If the lubrication fitting blows off, do the steps that follow:
 - (a) Make sure there is not a blockage or unwanted material in the lubrication path.
 - (b) Install a new lubrication fitting.

S 643-032

CAUTION: BE CAREFUL WHEN YOU DISENGAGE THE GREASE GUN FROM THE LUBRICATION FITTING. THE GREASE GUN CAN CAUSE DAMAGE TO THE FITTING.

- (2) Lubricate the aft trunnion bushing of the main landing gear.

NOTE: You must use BMS 3-38 (Recommended) or BMS 3-27 (Alternate) Corrosion Inhibiting Compound to lubricate the aft trunnion bushing (Fig. 302).

G. Put the Airplane Back to Its Usual Condition.

S 083-047

WARNING: OBEY THE REMOVAL PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Remove the door locks and close the doors (AMM 32-00-15/201).

TASK 12-21-14-603-009

4. Lubricate the Pivot Pin on the Main Landing Gear (Fig. 304)

A. Equipment

- (1) Main Landing Gear Door Lock - A32030-6 or -12 or -18 or -21

EFFECTIVITY

ALL

12-21-14

12

Page 304
Aug 22/06

B. Consumable Materials

- (1) D00528 Grease - Royco 11-MS

C. References

- (1) AMM 32-00-15/201, Landing Gear Door Locks
- (2) AMM 32-00-20/201, Landing Gear Downlocks

D. Access

- (1) Location Zones
730/740 Main Landing Gear and Doors

E. Prepare to Lubricate the Pivot Pin.

S 483-042

WARNING: MAKE SURE THE DOWNLOCKS ARE INSTALLED IN ALL OF THE GEAR. WITHOUT THE DOWNLOCKS, THE LANDING GEAR COULD RETRACT AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 483-048

WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

F. Pivot Pin Lubrication

S 643-013

CAUTION: DO NOT USE A PRESSURE OF MORE THAN 2500 PSI WHEN YOU LUBRICATE THE MAIN LANDING GEAR. A PRESSURE OF MORE THAN 2500 PSI CAN CAUSE THE LUBRICATION FITTING TO BLOW OFF.

- (1) If the lubrication fitting blows off, do the steps that follow:
 - (a) Make sure there is not a blockage or unwanted material in the lubrication path.
 - (b) Install a new lubrication fitting.

EFFECTIVITY

ALL

12-21-14

08

Page 305
Apr 22/06

S 643-014

CAUTION: BE CAREFUL WHEN YOU DISENGAGE THE GREASE GUN FROM THE LUBRICATION FITTING. THE GREASE GUN CAN CAUSE DAMAGE TO THE FITTING.

- (2) Lubricate the pivot pin.
- G. Put the Airplane Back to Its Usual Condition.

S 083-049

WARNING: OBEY THE REMOVAL PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Remove the door locks and close the doors (AMM 32-00-15/201).

TASK 12-21-14-603-054

5. Lubricate the Brake Rods and the Brake Sleeves on the Main Landing Gear (Fig. 304)

- A. Equipment
 - (1) Main Landing Gear Door Lock - A32030-6 or -12 or -18 or -21
- B. Consumable Materials
 - (1) Wheel bearing grease -
Aircraft, General Purpose, Wide Temperature:
 - (a) D00378 - Aeroshell 22
 - (b) D00233 - Mobilgrease 28
 - (c) D50005 - Mobil Aviation Grease SHC 100
 - (d) D00258 - Aeroshell 5 (Alternative)
 - (2) D00528 Grease - Royco 11-MS
- C. References
 - (1) AMM 32-00-15/201, Landing Gear Door Locks
 - (2) AMM 32-00-20/201, Landing Gear Downlocks
- D. Access
 - (1) Location Zones
 - 730/740 Main Landing Gear and Doors
- E. Prepare to Lubricate the Brake Rods and Brake Sleeves

S 483-056

WARNING: MAKE SURE THE DOWNLOCKS ARE INSTALLED IN ALL OF THE GEAR. WITHOUT THE DOWNLOCKS, THE LANDING GEAR CAN RETRACT AND CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

EFFECTIVITY

ALL

12-21-14

12

Page 306
Dec 22/08

S 483-057

WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (2) If the landing gear doors are open, install the door locks (AMM 32-00-15/201).

F. Brake Rod Lubrication/Brake Sleeve Lubrication

S 643-058

CAUTION: DO NOT USE A PRESSURE OF MORE THAN 2500 PSI WHEN YOU LUBRICATE THE MAIN LANDING GEAR. A PRESSURE OF MORE THAN 2500 PSI CAN CAUSE THE LUBRICATION FITTING TO BLOW OFF.

- (1) If the lubrication fitting blows off, do the steps that follow:
 - (a) Make sure there is not a blockage or unwanted material in the lubrication path.
 - (b) Install a new lubrication fitting.

S 643-059

CAUTION: BE CAREFUL WHEN YOU DISENGAGE THE GREASE GUN FROM THE LUBRICATION FITTING. THE GREASE GUN CAN CAUSE DAMAGE TO THE FITTING.

- (2) Lubricate the brake rods/brake sleeves.
- G. Put the Airplane Back to Its Usual Condition.

S 413-064

- (1) Close the access panels (AMM 06-44-00/201).

S 083-063

WARNING: OBEY THE REMOVAL PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (2) Remove the door locks and close the doors (AMM 32-00-15/201).

EFFECTIVITY

ALL

12-21-14

03

Page 307
Dec 22/08

TASK 12-21-14-603-030

6. AIRPLANES WITH THE MAIN GEAR TORQUE ARM ZIRK FITTING;

Lubricate the Main Gear Torque Arm (Fig. 302)

A. Equipment

(1) Main Landing Gear Door Lock - A32030-6 or -12 or -18 or -21

B. Consumable Materials

(1) D00528 Grease - Royco 11-MS

C. References

(1) AMM 32-00-15/201, Landing Gear Door Locks

(2) AMM 32-00-20/201, Landing Gear Downlocks

D. Access

(1) Location Zones
730/740 Main Landing Gear and Doors

E. Prepare to Lubricate the Torque Arm

S 483-043

WARNING: MAKE SURE THE DOWNLOCKS ARE INSTALLED IN ALL OF THE GEAR.
WITHOUT THE DOWNLOCKS, THE LANDING GEAR COULD RETRACT AND CAUSE
INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 483-050

WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS
OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE
INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(2) Open the doors for the landing gear and install the door locks
(AMM 32-00-15/201).

F. Lubricate the Torque Arm (Fig. 302).

EFFECTIVITY

ALL

12-21-14

S 433-036

CAUTION: DO NOT USE A PRESSURE OF MORE THAN 2500 PSI WHEN YOU LUBRICATE THE MAIN LANDING GEAR. A PRESSURE OF MORE THAN 2500 PSI CAN CAUSE THE LUBRICATION FITTING TO BLOW OFF.

- (1) If the lubrication fitting blows off, do the steps that follow:
 - (a) Make sure there is not a blockage or unwanted material in the lubrication path.
 - (b) Install a new lubrication fitting.

S 643-037

CAUTION: BE CAREFUL WHEN YOU DISENGAGE THE GREASE GUN FROM THE LUBRICATION FITTING. THE GREASE GUN CAN CAUSE DAMAGE TO THE FITTING.

- (2) Lubricate the torque arm.
- G. Put the Airplane Back to Its Usual Condition.

S 083-051

WARNING: OBEY THE REMOVAL PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY. THE MOVEMENT OF THE DOORS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Remove the door locks and close the doors (AMM 32-00-15/201).

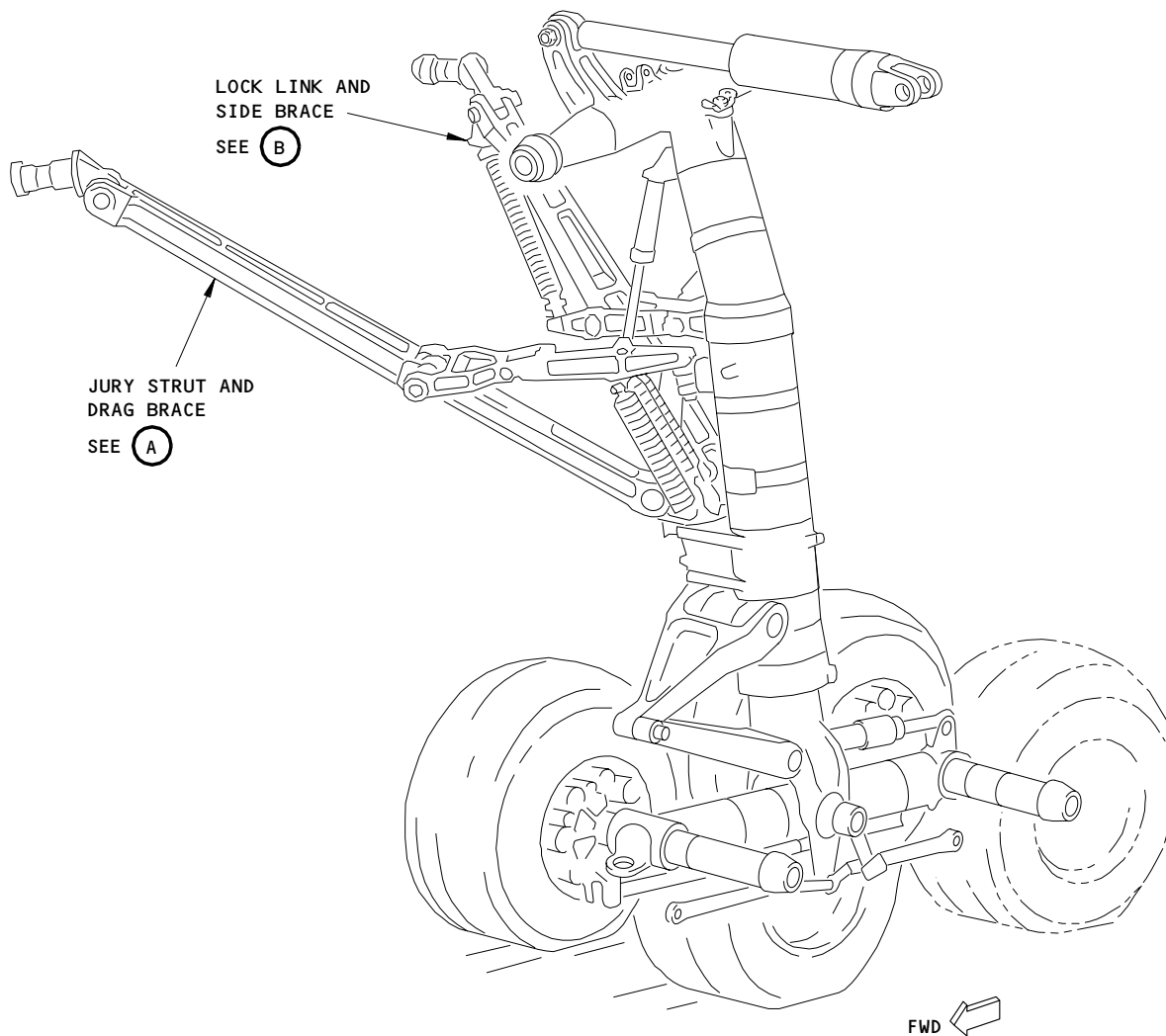
EFFECTIVITY

ALL

12-21-14

03

Page 309
Apr 22/06



LEFT MAIN LANDING GEAR

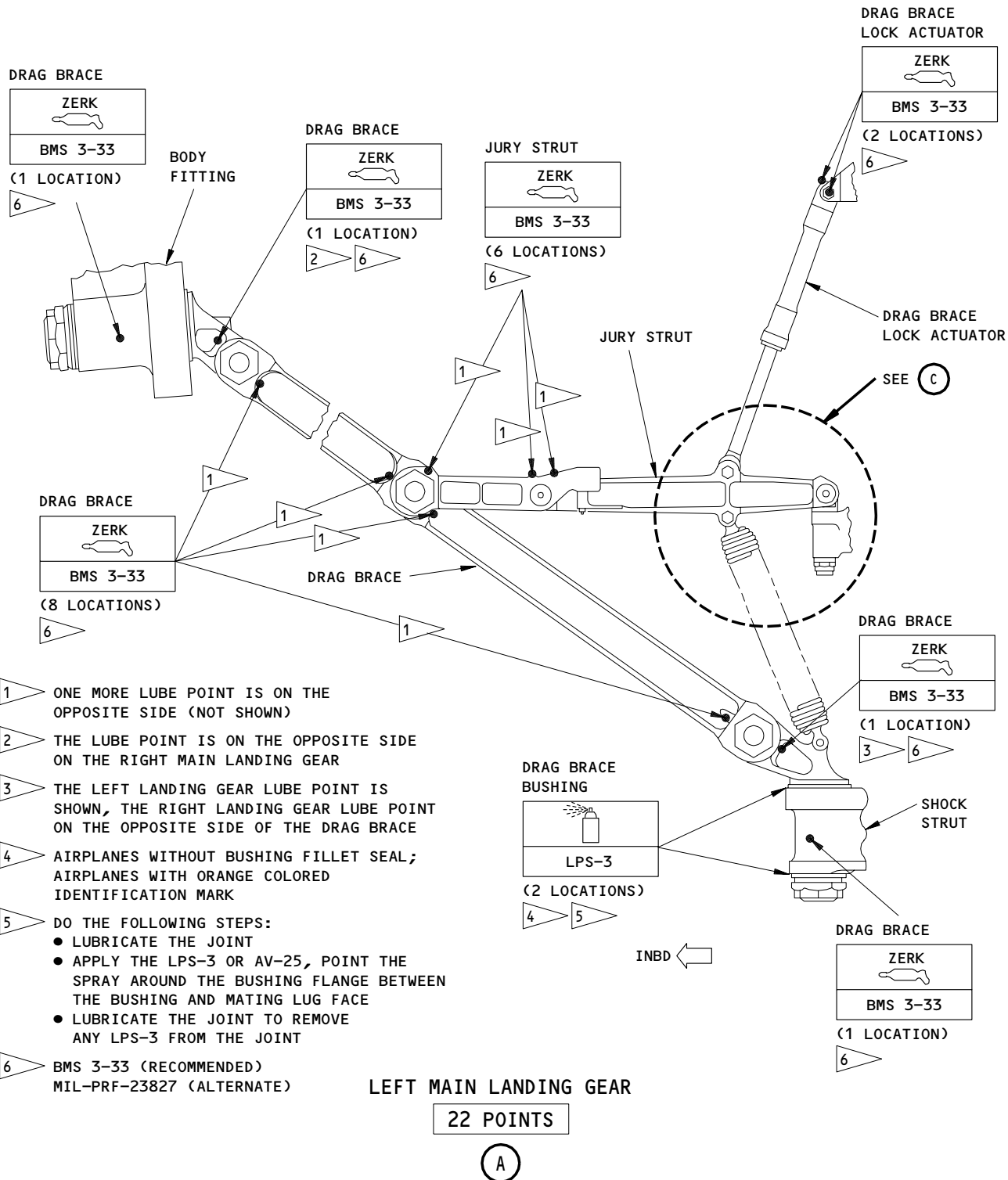
Lubrication of the Upper End for the Main Landing Gear
Figure 301 (Sheet 1)

EFFECTIVITY	
	ALL

12-21-14

02

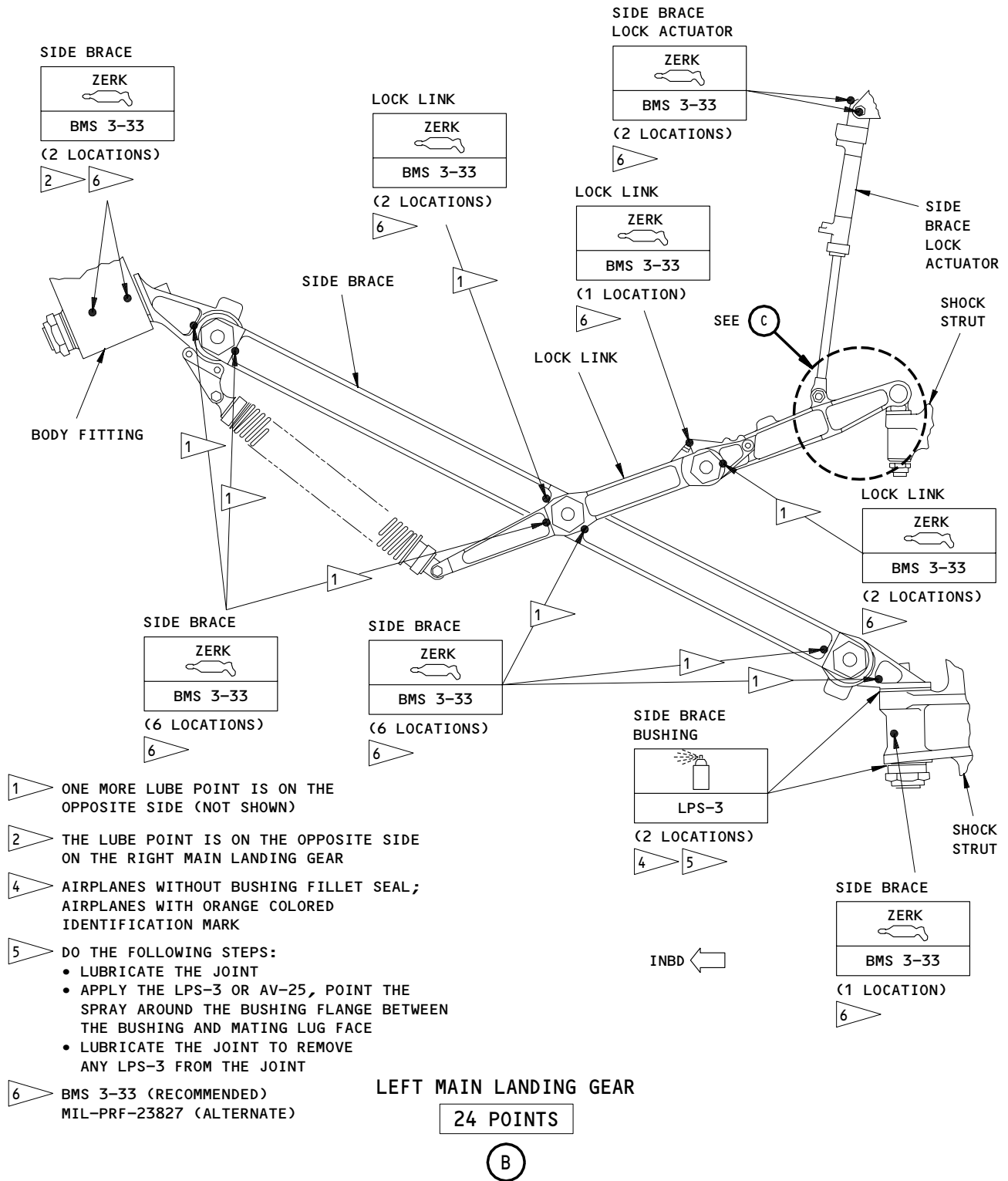
Page 310
Apr 22/06



Lubrication of the Upper End for the Main Landing Gear
Figure 301 (Sheet 2)

EFFECTIVITY	ALL
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12-21-14



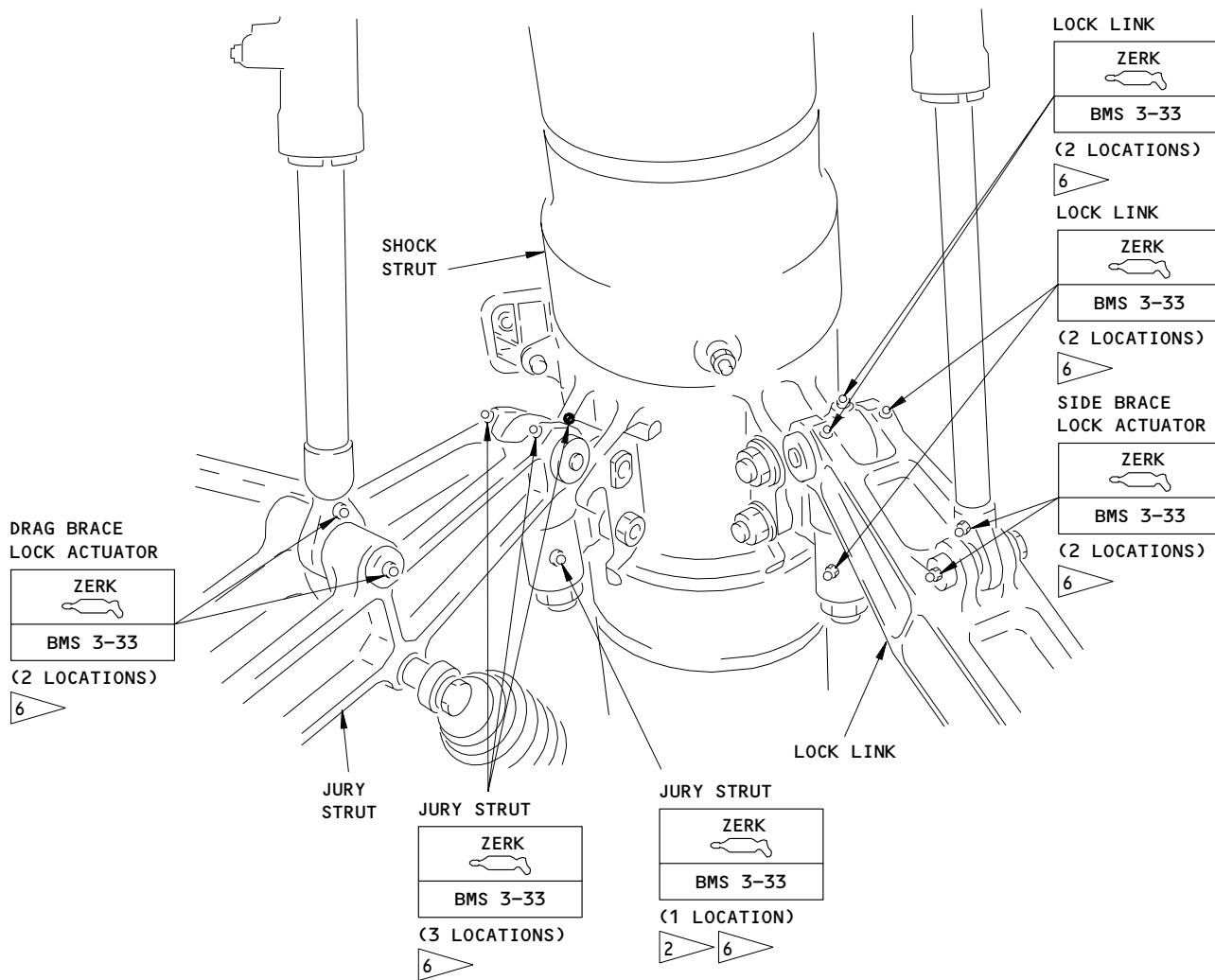
- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN)
- 2 THE LUBE POINT IS ON THE OPPOSITE SIDE ON THE RIGHT MAIN LANDING GEAR
- 4 AIRPLANES WITHOUT BUSHING FILLET SEAL; AIRPLANES WITH ORANGE COLORED IDENTIFICATION MARK
- 5 DO THE FOLLOWING STEPS:
 - LUBRICATE THE JOINT
 - APPLY THE LPS-3 OR AV-25, POINT THE SPRAY AROUND THE BUSHING FLANGE BETWEEN THE BUSHING AND MATING LUG FACE
 - LUBRICATE THE JOINT TO REMOVE ANY LPS-3 FROM THE JOINT
- 6 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Lubrication of the Upper End for the Main Landing Gear
Figure 301 (Sheet 3)

EFFECTIVITY	ALL
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12-21-14

682931



(VIEW IN THE OUTBOARD DIRECTION)

12 POINTS

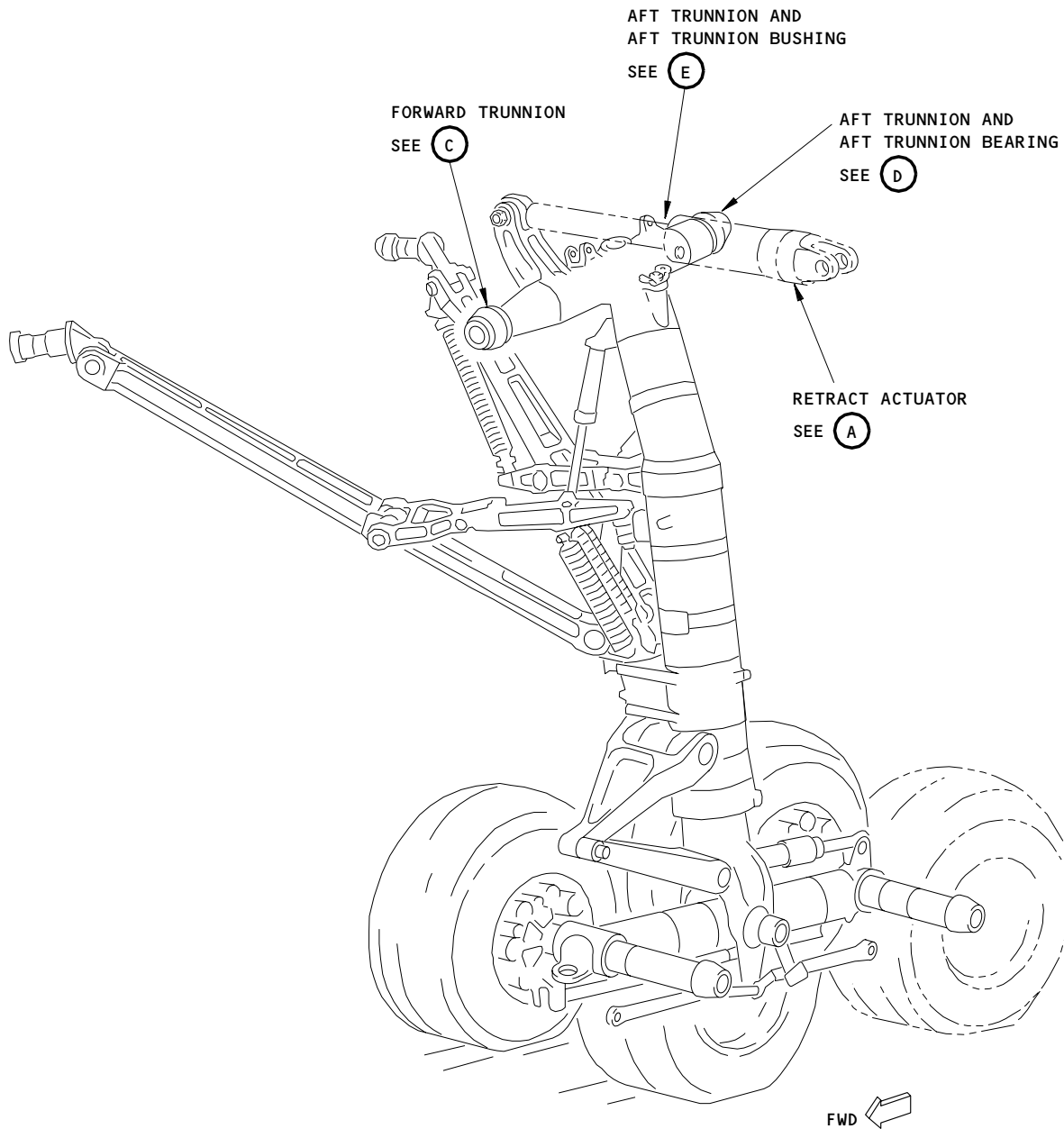
C

- 2 THE LUBE POINT IS ON THE OPPOSITE SIDE ON THE RIGHT MAIN LANDING GEAR
- 6 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Lubrication of the Upper End for the Main Landing Gear
Figure 301 (Sheet 4)

EFFECTIVITY	ALL
-------------	-----

12-21-14



LEFT MAIN LANDING GEAR

Lubrication of the Upper End/Lower End for the Main Landing Gear
Figure 302 (Sheet 1)

EFFECTIVITY	
	ALL

12-21-14

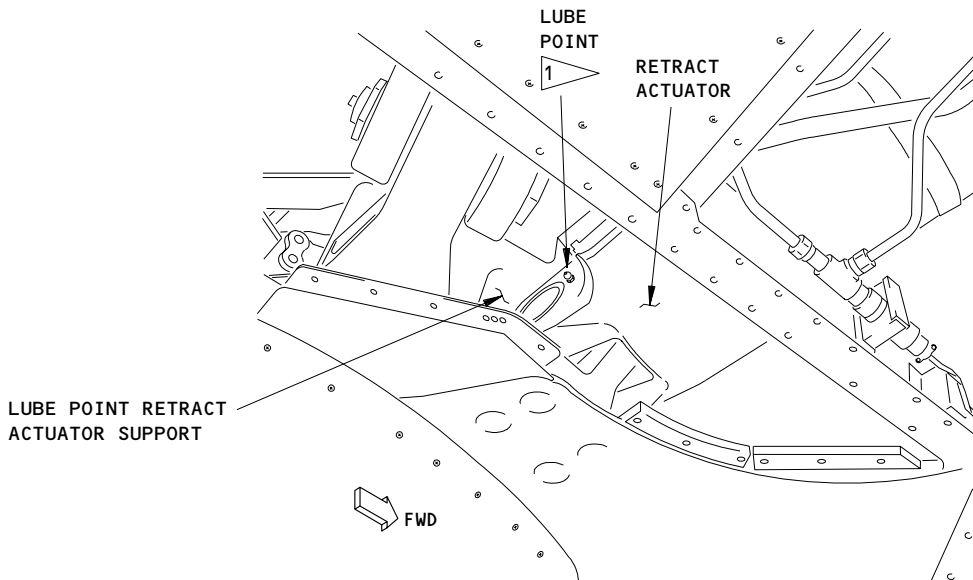
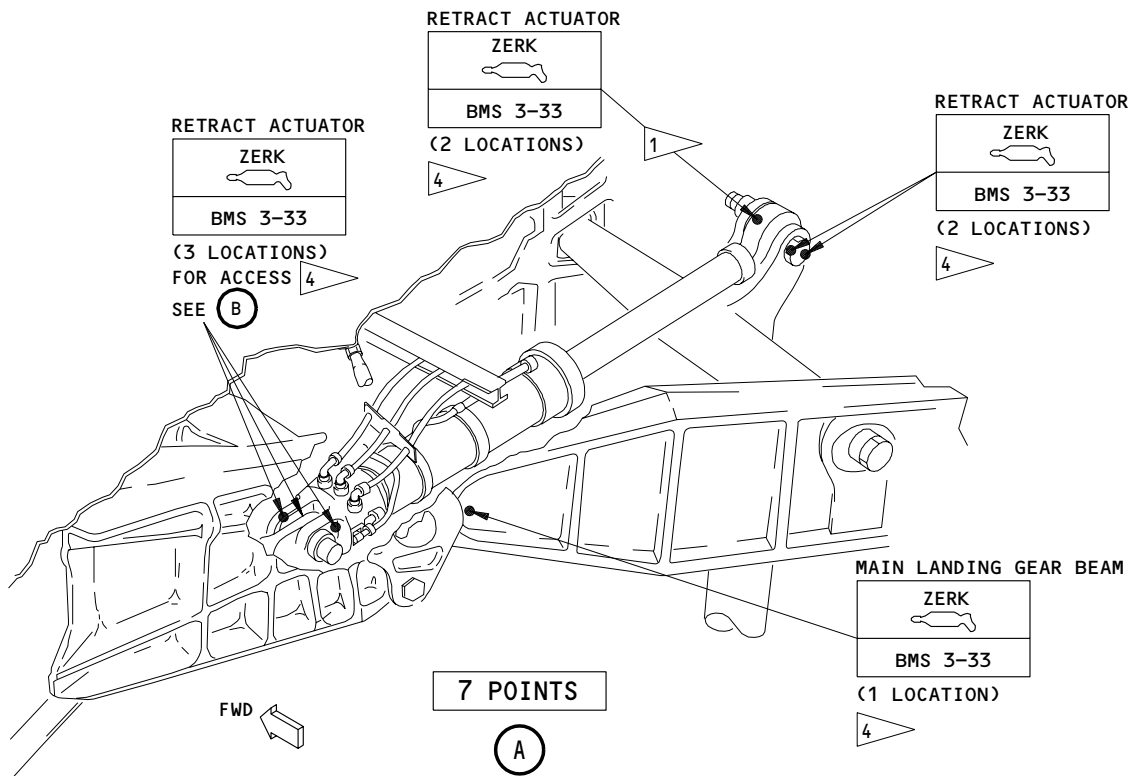
02

Page 314
Apr 22/06

682939

BOEING

767 MAINTENANCE MANUAL



- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN).
- 4 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

RETRACT ACTUATOR
(THE ACCESS PANEL IS REMOVED)
(VIEW IN THE UP DIRECTION)

Lubrication of the Upper End/Lower End for the Main Landing Gear
Figure 302 (Sheet 2)

EFFECTIVITY

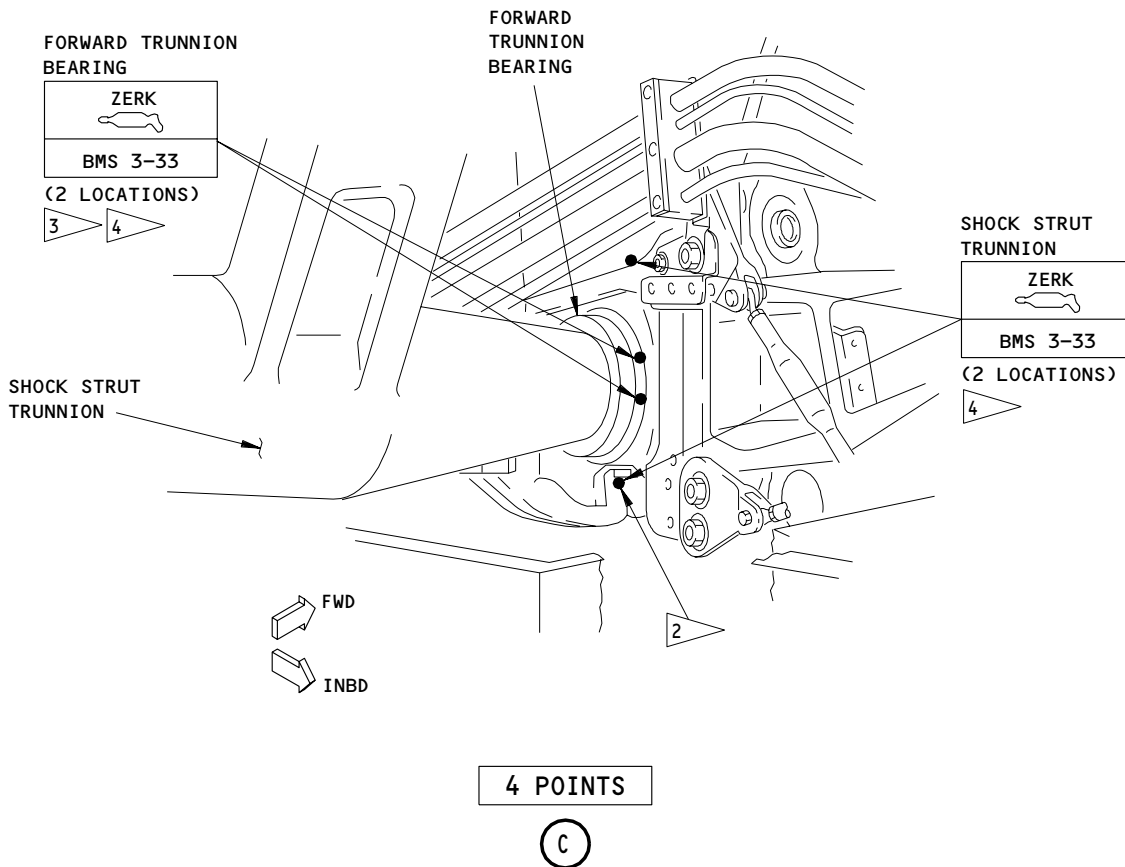
ALL

12-21-14

02

Page 315
Dec 22/07

682943



- 2 ON AIRPLANES WITH A HOLE IN THE TRAILING EDGE PANEL, YOU CAN GET ACCESS TO THE LUBE POINT THROUGH THE HOLE, OR REMOVE THE ACCESS PANEL.
- 3 SOME HOUSINGS CAN HAVE THE GREASE FITTINGS ON THE LOWER SIDE OF THE TRUNNION.
- 4 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

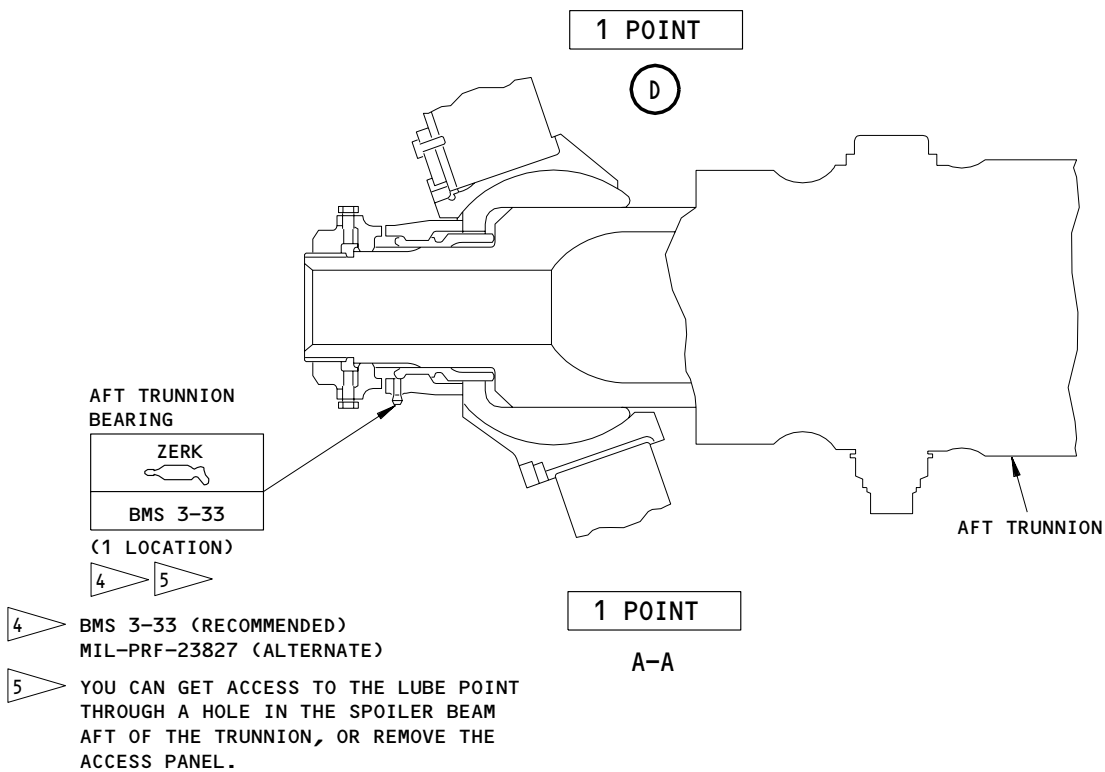
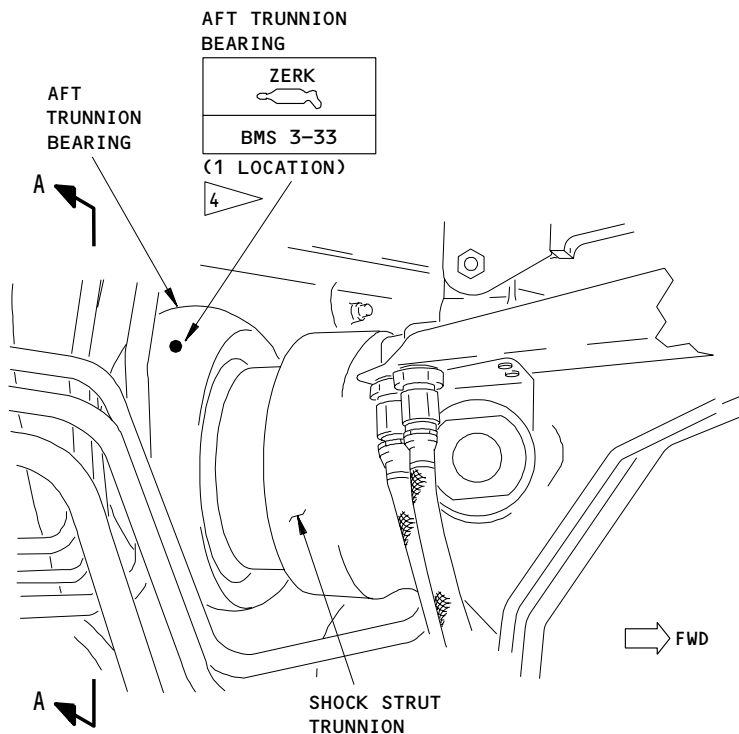
Lubrication of the Upper End/Lower End for the Main Landing Gear
Figure 302 (Sheet 3)

EFFECTIVITY	ALL
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12-21-14

BOEING

767 MAINTENANCE MANUAL



Lubrication of the Upper End/Lower End for the Main Landing Gear
Figure 302 (Sheet 4)

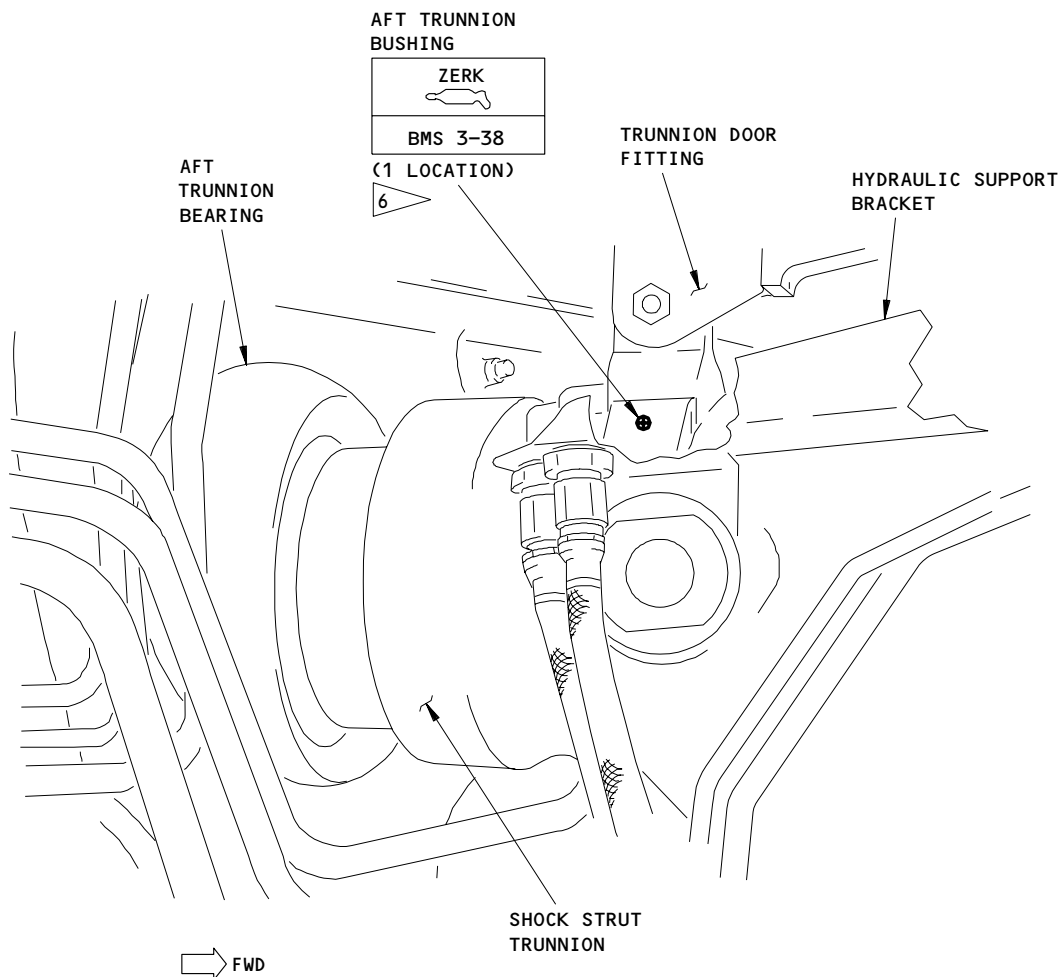
EFFECTIVITY	ALL
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12-21-14

02

Page 317
Apr 22/06

682955



1 POINT

E

6 BMS 3-38 (RECOMMENDED)
BMS 3-27 (ALTERNATE)

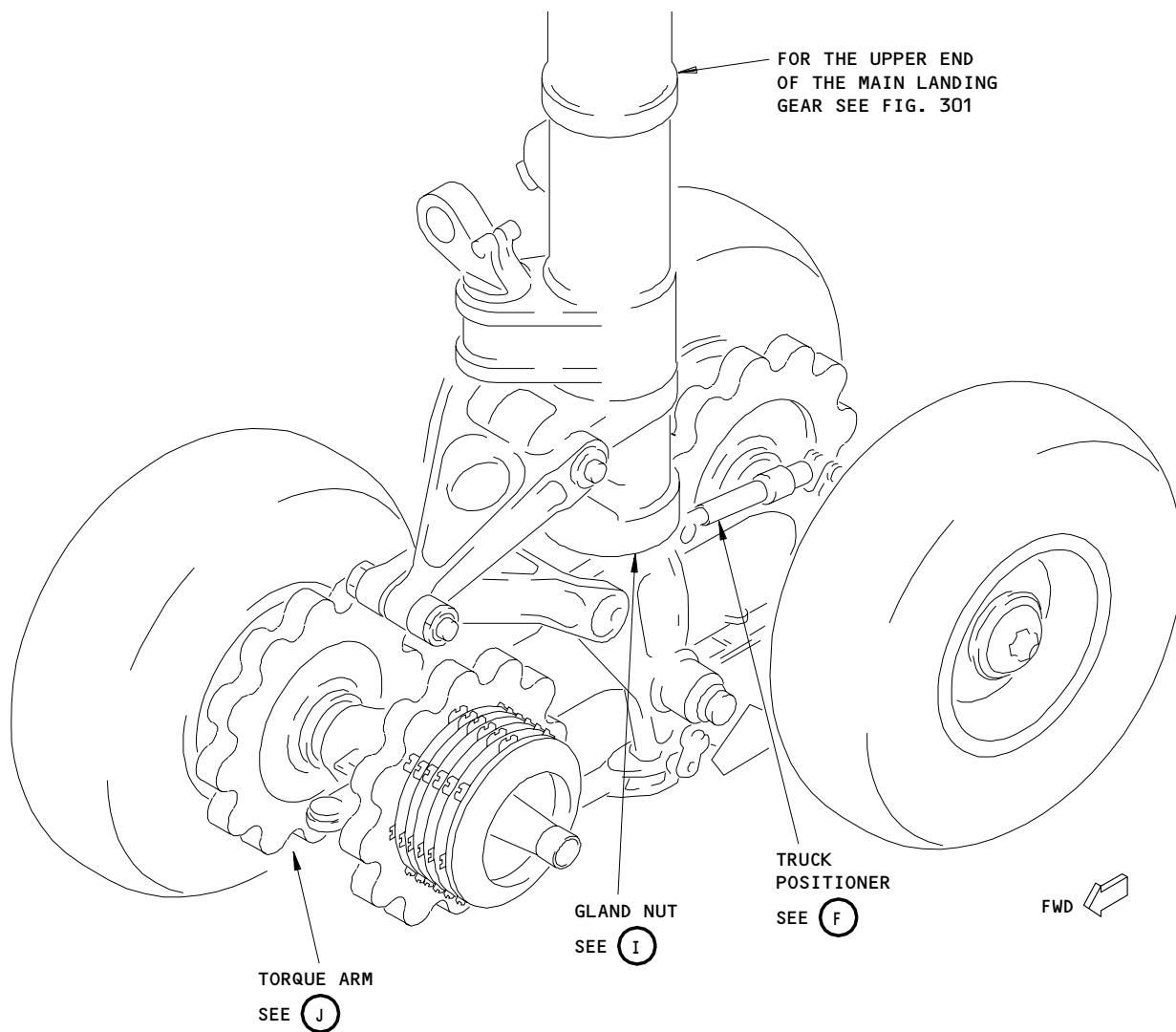
Lubrication of the Upper End/Lower End for the Main Landing Gear
Figure 302 (Sheet 5)

EFFECTIVITY	ALL
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12-21-14

02

Page 318
Apr 22/06



Lubrication of the Upper End/Lower End for the Main Landing Gear
Figure 302 (Sheet 6)

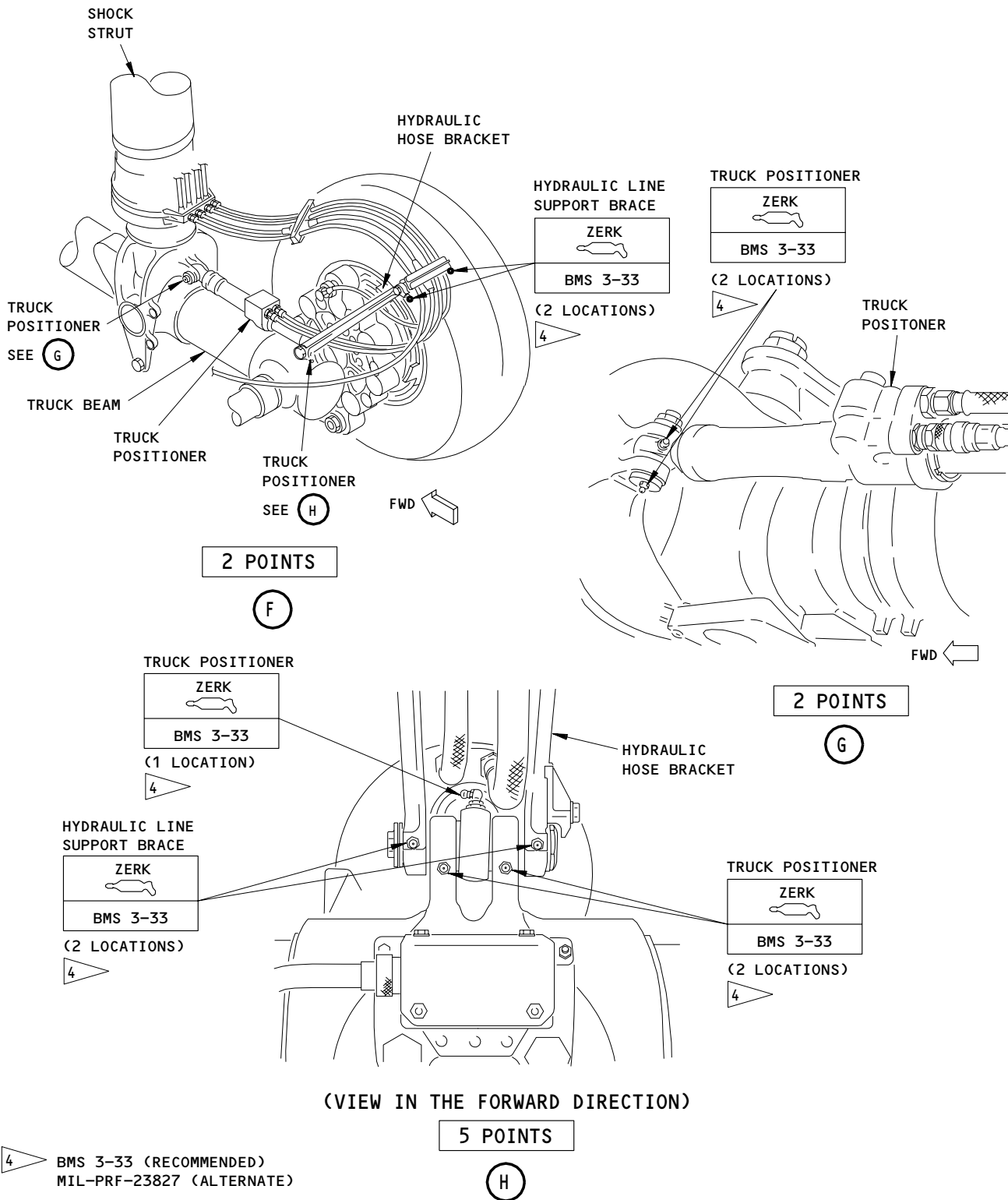
EFFECTIVITY	
	ALL

12-21-14

02

Page 319
Apr 22/06

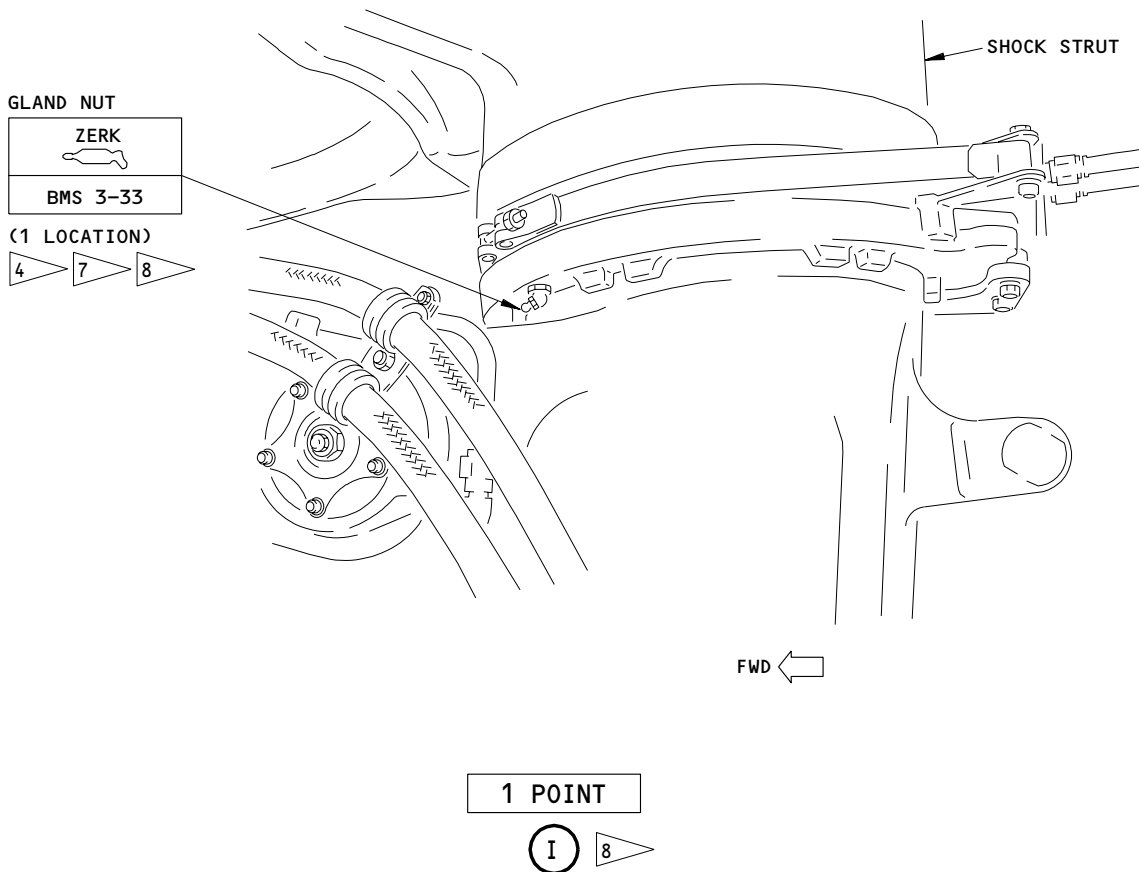
686470



Lubrication of the Upper End/Lower End for the Main Landing Gear
Figure 302 (Sheet 7)

EFFECTIVITY	ALL
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12-21-14



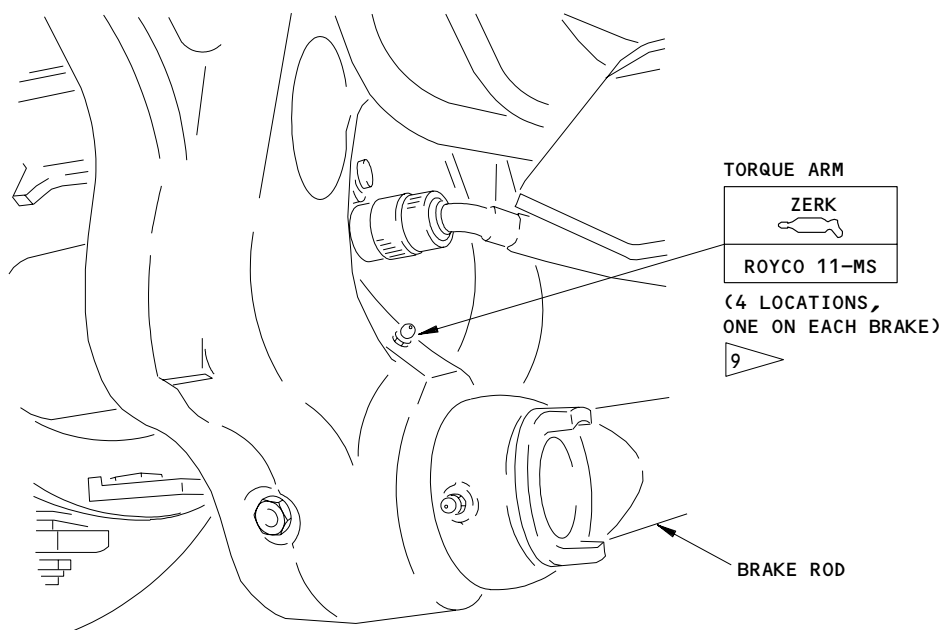
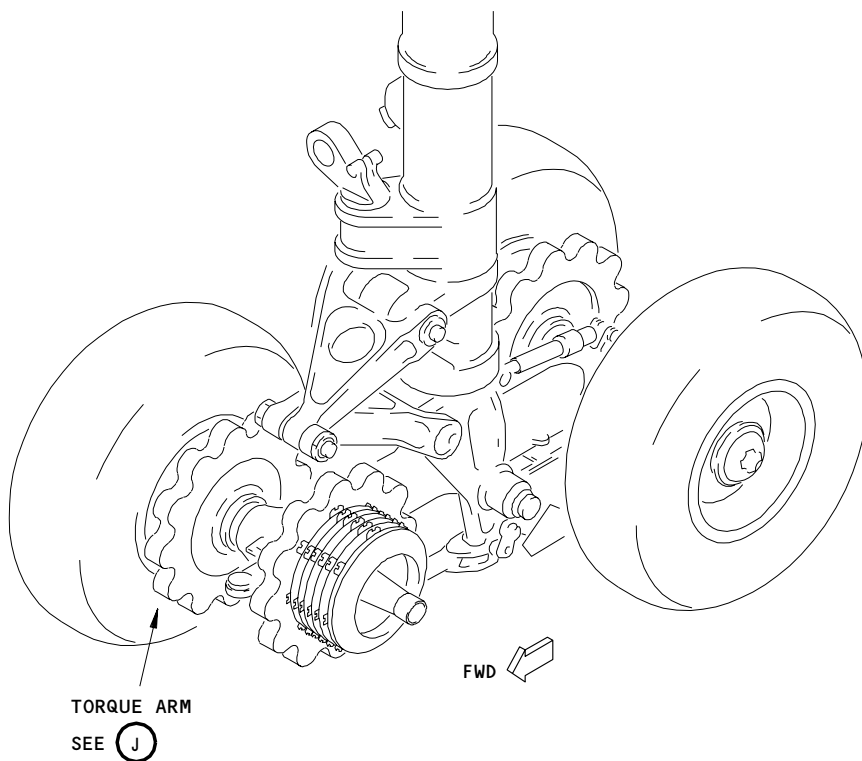
- 4 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)
- 7 THE LOCATION OF THE FITTING FOR THE
GLAND NUT CAN CHANGE AROUND THE SHOCK
STRUT.
- 8 NOT INSTALLED ON ALL AIRPLANES.

CAUTION: DO NOT OVER LUBRICATE THE GLAND NUT. USE MINIMUM PRESSURE ON THE HANDPUMP TO APPLY THE GREASE. APPLY THE EQUIVALENT OF 3-5 PUMPS OF A MEDIUM SIZE GREASE GUN. OVER LUBRICATION OR EXCESSIVE LUBE PRESSURE CAN CAUSE DAMAGE TO THE SCRAPER RING AND/OR SEALS.

Lubrication of the Upper End/Lower End for the Main Landing Gear
Figure 302 (Sheet 8)

EFFECTIVITY	ALL
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12-21-14



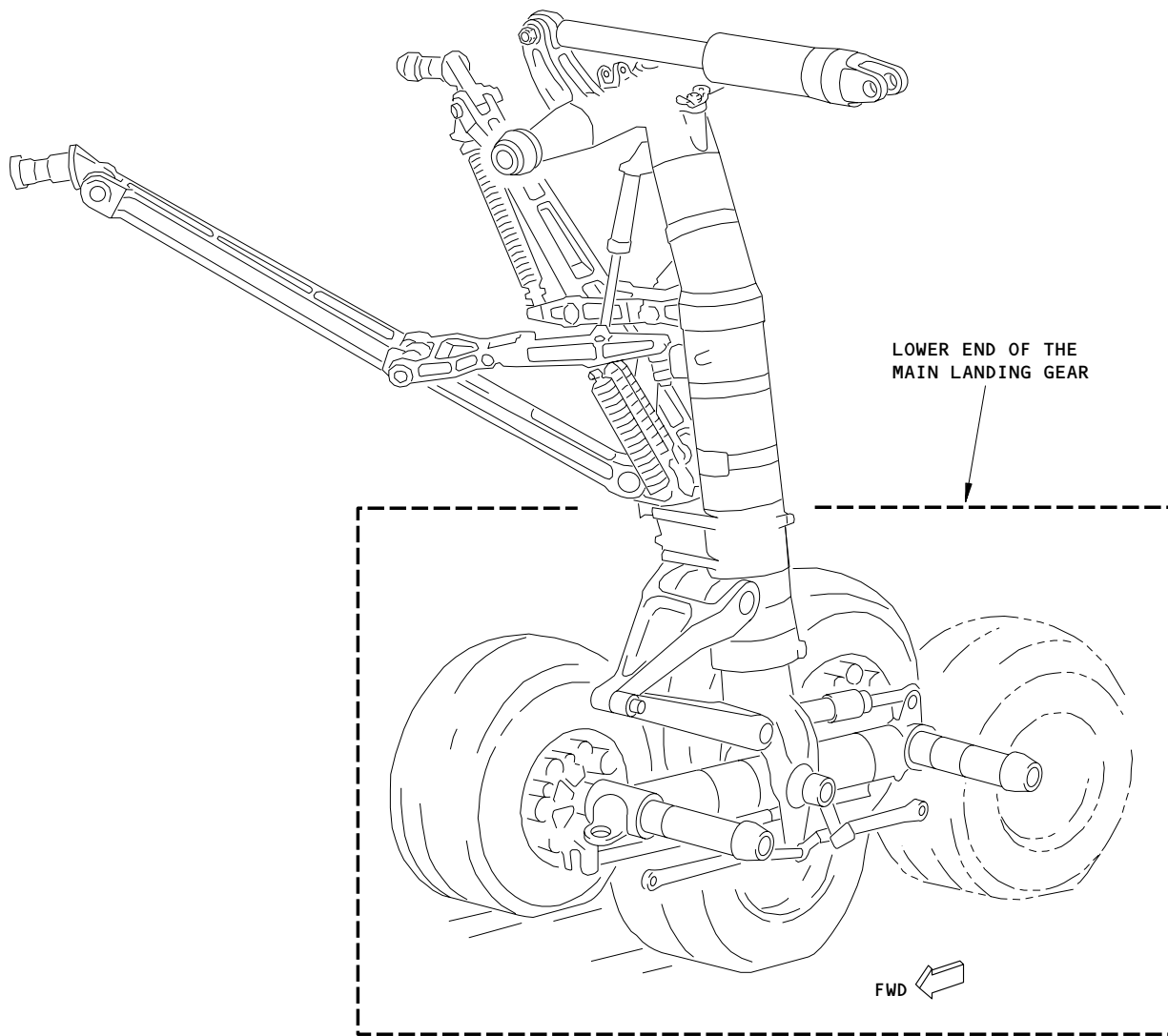
4 POINTS
(J)

9 ONLY USE THIS LUBRICANT

Lubrication of the Upper End/Lower End for the Main Landing Gear
Figure 302 (Sheet 9)

EFFECTIVITY
AIRPLANES WITH TORQUE ARM ZERK FITTING

12-21-14



LEFT MAIN LANDING GEAR

Lubrication of the Torsion Links for the Main Landing Gear
Figure 303 (Sheet 1)

EFFECTIVITY

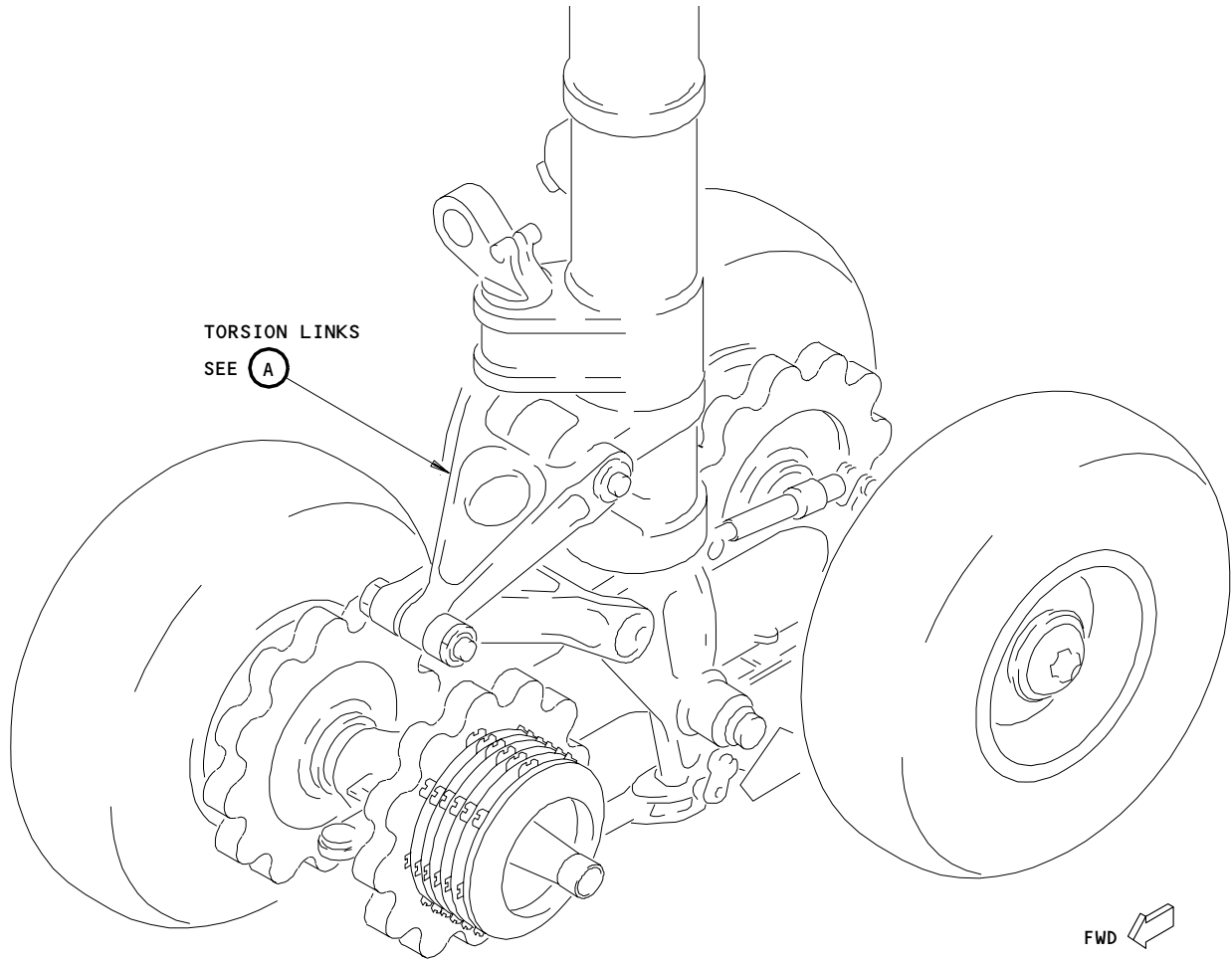
ALL

12-21-14

02

Page 323
Apr 22/06

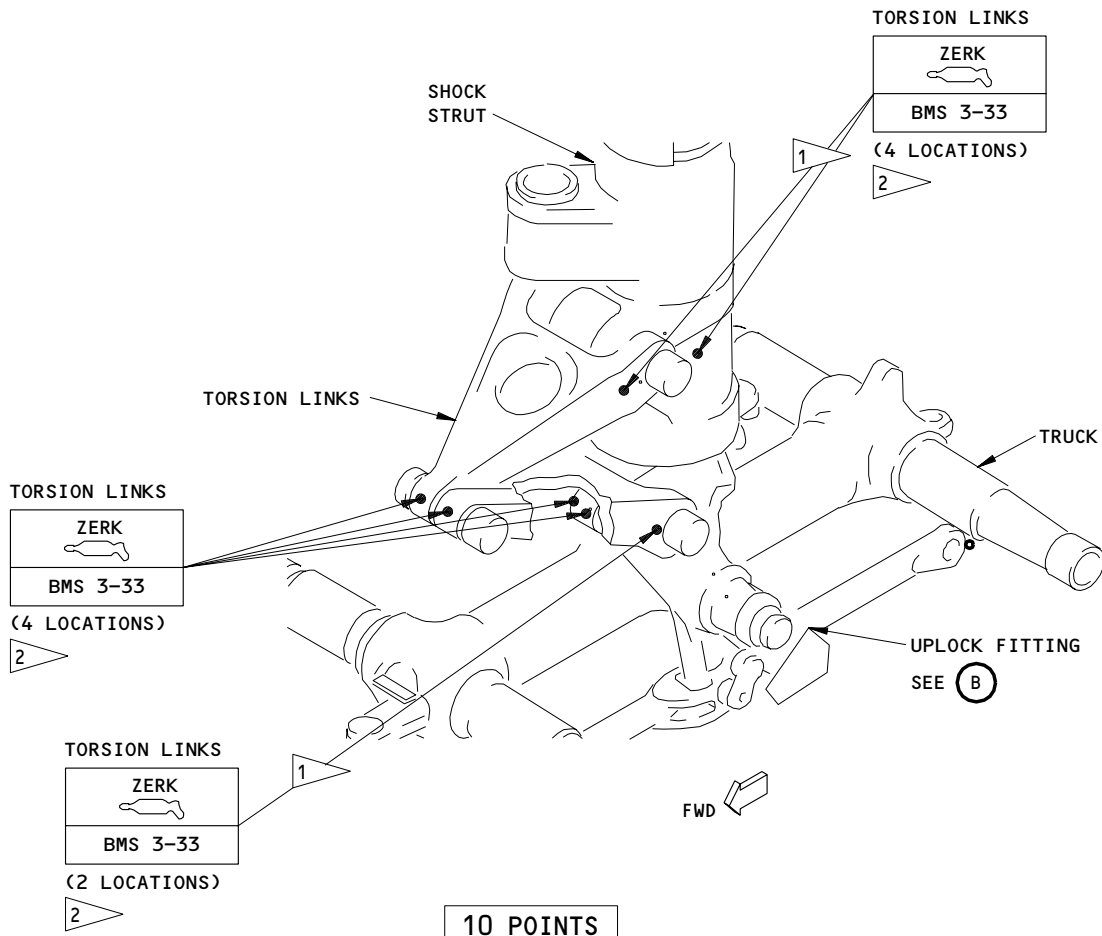
686566



Lubrication of the Torsion Links for the Main Landing Gear
Figure 303 (Sheet 2)

EFFECTIVITY	ALL
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12-21-14



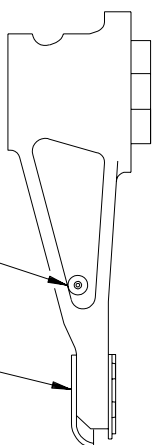
10 POINTS

(A)

UPLOCK FITTING
ZERK
ROYCO 11-MS
(1 LOCATION)

3

UPLOCK FITTING



1 POINT

(B)

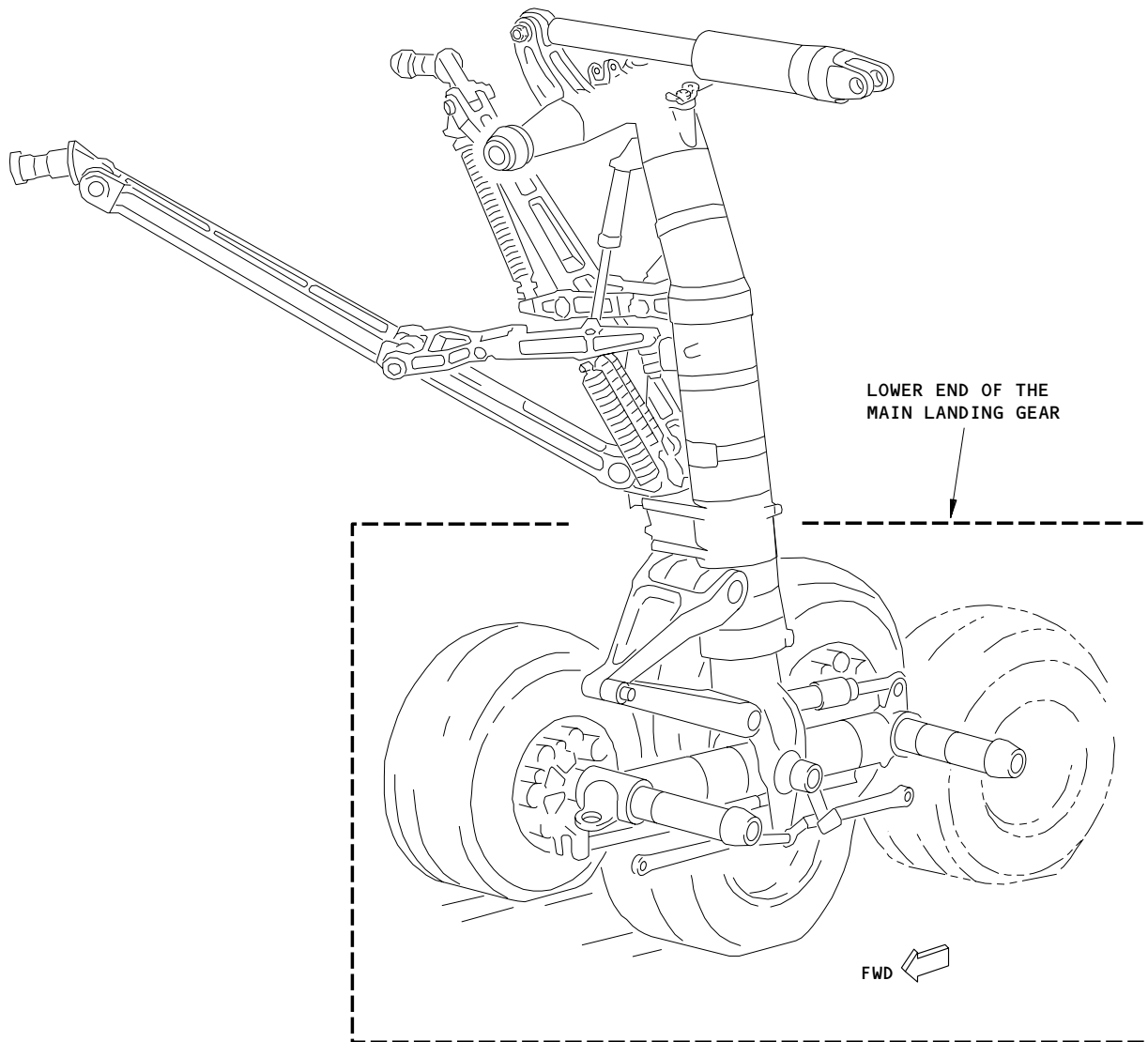
- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN).
- 2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)
- 3 ONLY USE THIS LUBRICANT

Lubrication of the Torsion Links for the Main Landing Gear
Figure 303 (Sheet 3)

EFFECTIVITY	ALL
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12-21-14

633469



LEFT MAIN LANDING GEAR

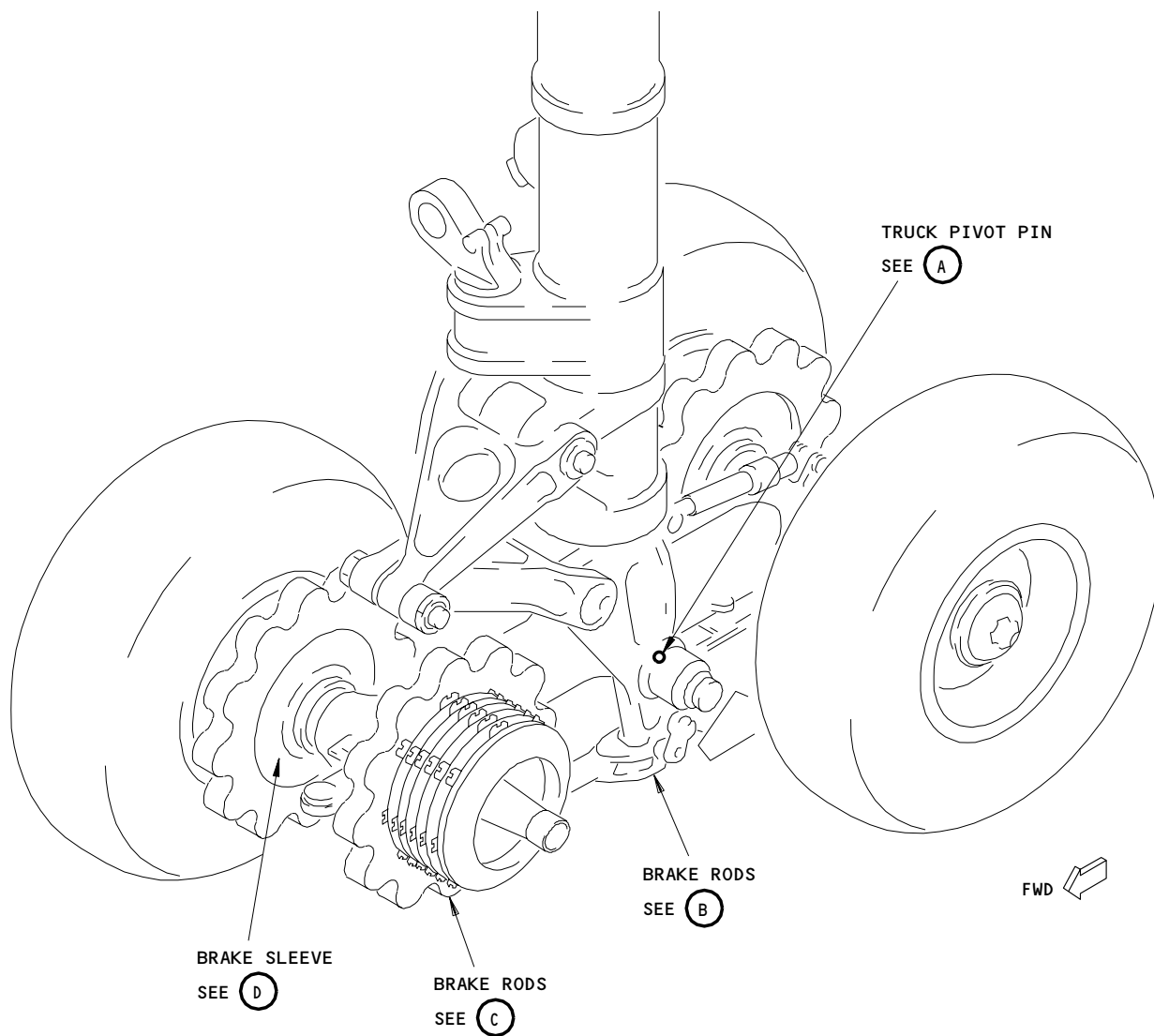
Lubrication of the Pivot Pins/Brake Rods/Brake Sleeve for the Main Landing Gear
Figure 304 (Sheet 1)

EFFECTIVITY	
	ALL

12-21-14

02

Page 326
Apr 22/06



Lubrication of the Pivot Pins/Brake Rods/Brake Sleeve for the Main Landing Gear
Figure 304 (Sheet 2)

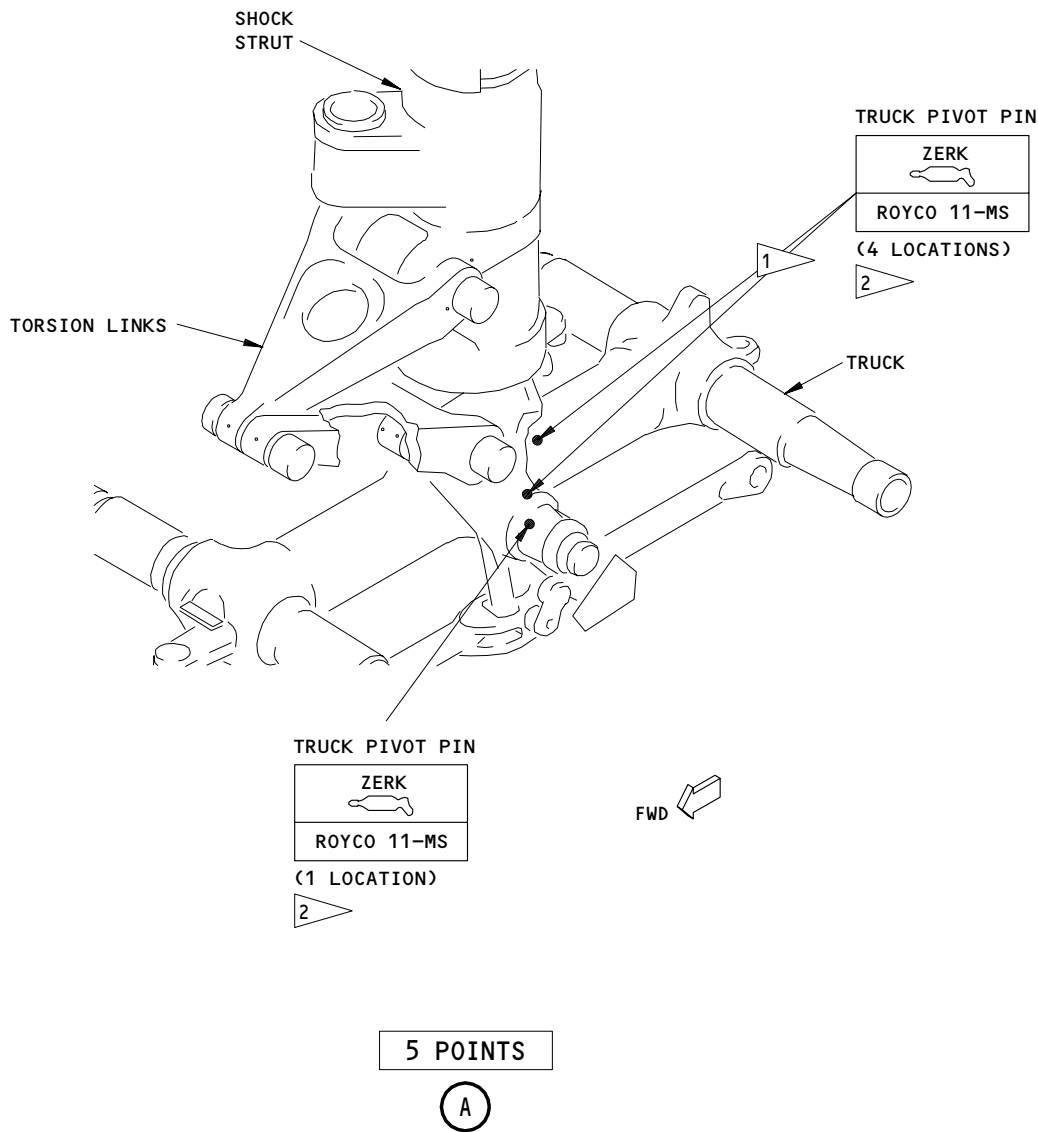
EFFECTIVITY	ALL
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12-21-14

02

Page 327
Apr 22/06

686576



1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN).

2 ONLY USE THIS LUBRICANT

Lubrication of the Pivot Pins/Brake Rods/Brake Sleeve for the Main Landing Gear
Figure 304 (Sheet 3)

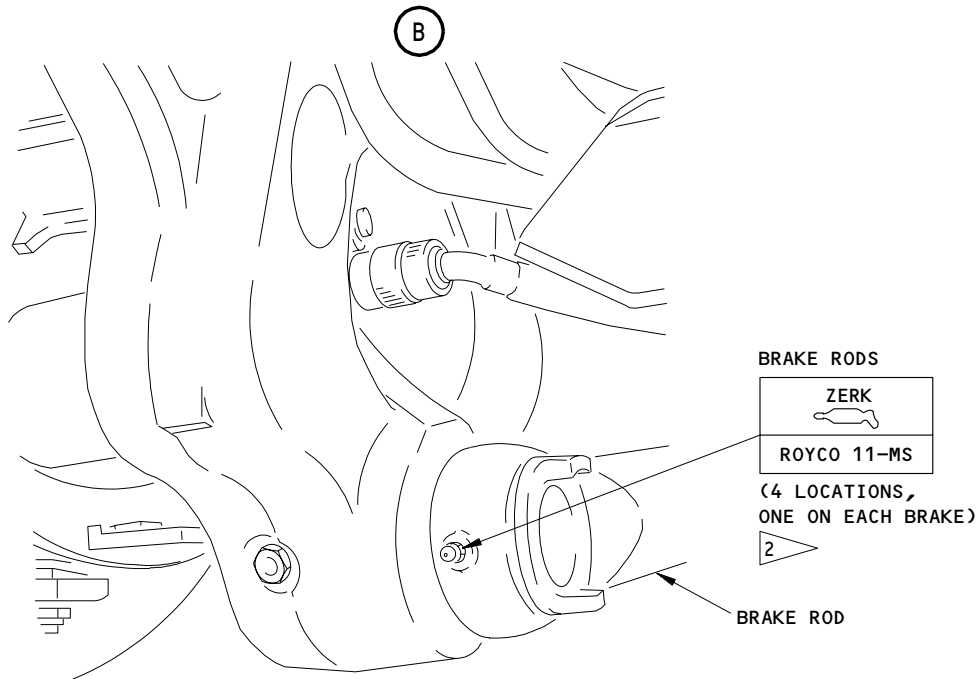
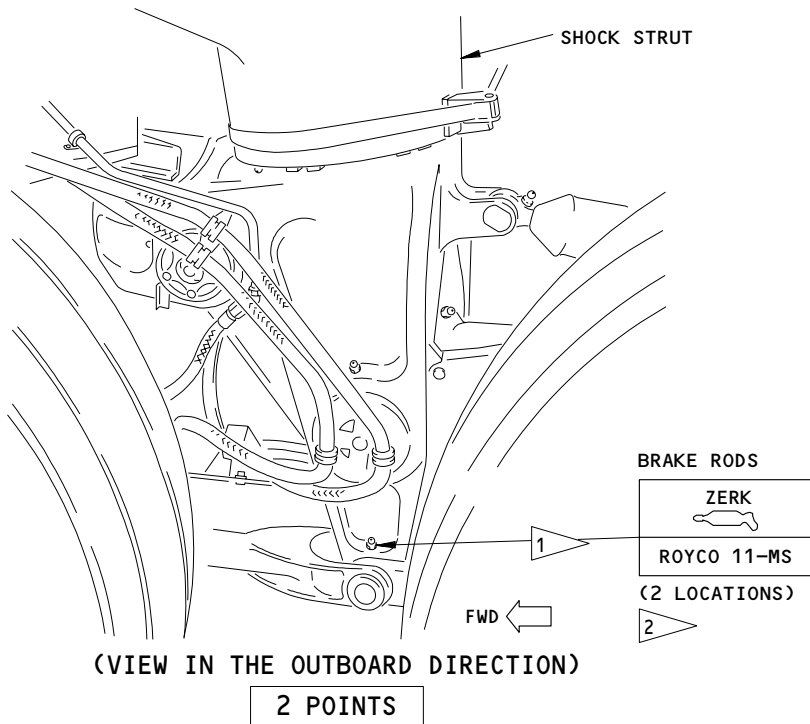
EFFECTIVITY	ALL
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12-21-14

02

Page 328
Apr 22/06

BOEING
767
MAINTENANCE MANUAL

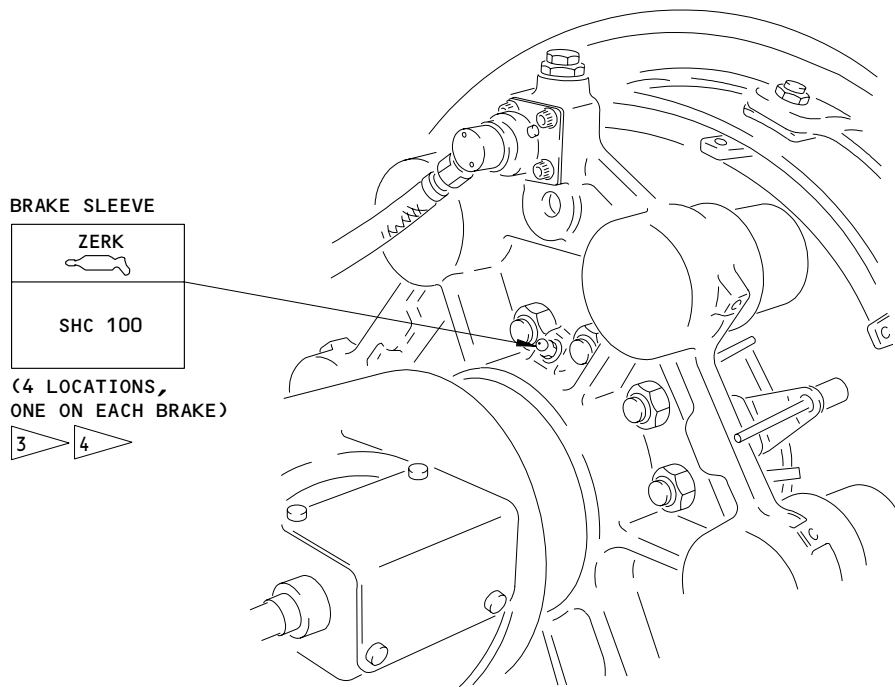


- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN).
- 2 ONLY USE THIS LUBRICANT

Lubrication of the Pivot Pins/Brake Rods/Brake Sleeve for the Main Landing Gear
Figure 304 (Sheet 4)

EFFECTIVITY	ALL
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12-21-14



4 POINTS

D

- 3 AEROSHELL 22 (RECOMMENDED)
MOBIL GREASE 28 (RECOMMENDED)
MOBIL AVIATION GREASE SHC 100 (RECOMMENDED)
AEROSHELL 5 (ALTERNATE)
- 4 LUBRICATE THROUGH THE GREASE FITTING WITH A SMALL QUANTITY OF GREASE. TOO MUCH LUBRICATION CAN CAUSE A FIRE DURING OPERATION

Lubrication of the Pivot Pins/Brake Rods/Brake Sleeve for the Main Landing Gear
Figure 304 (Sheet 5)

EFFECTIVITY	ALL
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12-21-14

01

Page 330
Apr 22/08

MAIN GEAR DOORS AND ACTUATING MECHANISMS – SERVICING

1. General

- A. This procedure contains the task to lubricate the doors and the actuating mechanisms of the main landing gear.

TASK 12-21-15-603-001

2. Lubricate the Doors and the Actuating Mechanisms of the Main Landing Gear

A. Equipment

- (1) Main Landing Gear Door Lock - A32030-6 or -12 or -18 or -21

B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Recommended)
(2) D00013 Grease - MIL-PRF-23827 (Alternative)

C. References

- (1) AMM 32-00-15/201, Landing Gear Door Locks
(2) AMM 32-00-20/201, Landing Gear Downlocks

D. Access

- (1) Location Zones
- | | |
|---------|-------------------------|
| 731/741 | Main Landing Gear (MLG) |
| 732/742 | MLG Body Doors |
| 733/743 | MLG Drag Brace Doors |
| 734/744 | MLG Oleo Doors |
| 735/745 | MLG Trunnion Doors |

- E. Prepare to Lubricate the Doors and the Actuating Mechanisms.

S 483-008

WARNING: MAKE SURE THE DOWNLOCKS ARE INSTALLED IN ALL OF THE LANDING GEAR. WITHOUT THE DOWNLOCKS, THE LANDING GEAR COULD RETRACT AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 483-009

WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the landing gear and install the door locks (AMM 32-00-15/201).

EFFECTIVITY

ALL

12-21-15

12

Page 301
Apr 22/05

F. Lubricate the Doors and the Actuating Mechanism (Fig. 301).

S 643-004

CAUTION: BE CAREFUL WHEN YOU DISENGAGE THE GREASE GUN FROM THE LUBRICATION FITTING. THE GREASE GUN CAN CAUSE DAMAGE TO THE FITTING.

(1) Lubricate the doors and the actuating mechanisms.

G. Put The Airplane Back to Its Usual Condition.

S 083-010

WARNING: OBEY THE REMOVAL PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Remove the door locks and close the doors (AMM 32-00-15/201).

EFFECTIVITY

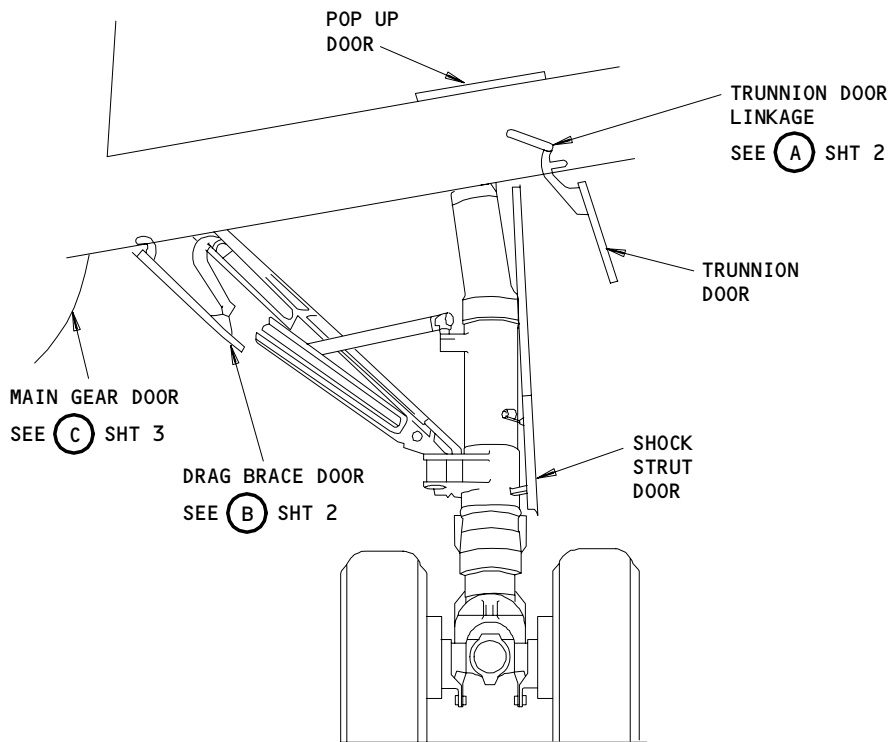
ALL

12-21-15

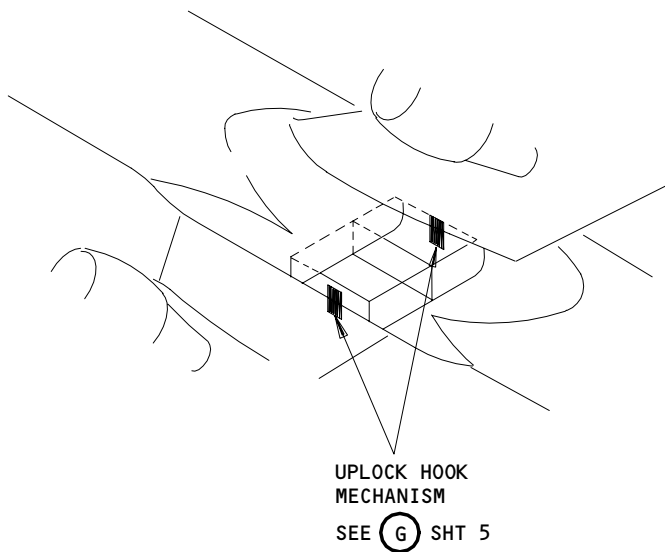
01

Page 302
Apr 22/05

BOEING
767
MAINTENANCE MANUAL



THE LEFT MAIN LANDING GEAR AND DOORS ARE SHOWN
(VIEW IN THE AFT DIRECTION)



Lubrication for the Doors and Actuating Mechanisms of the Main Landing Gear
Figure 301 (Sheet 1)

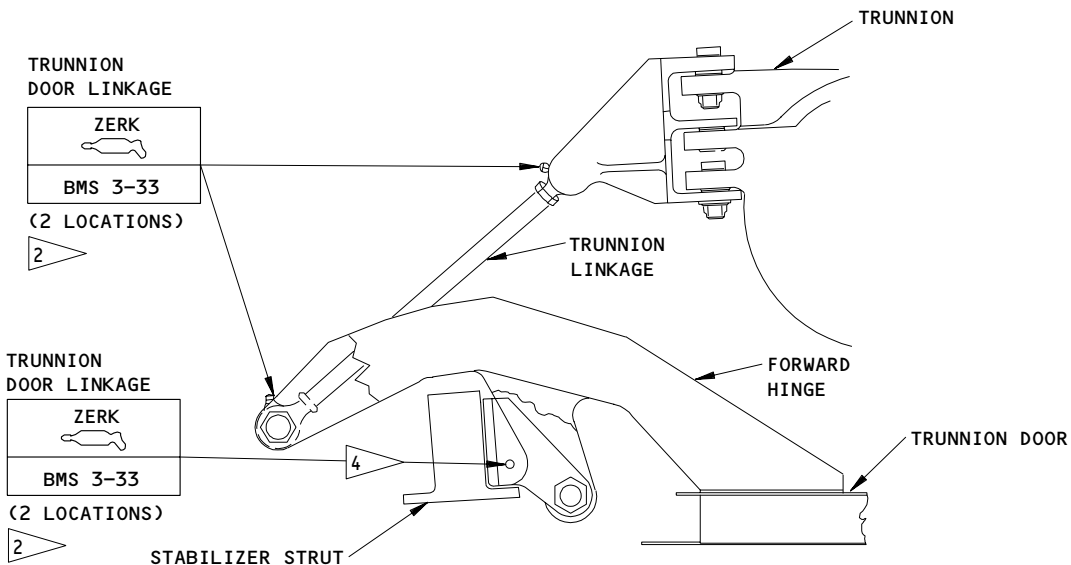
EFFECTIVITY	ALL
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12-21-15

01

Page 303
Aug 10/90

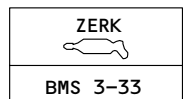
332800



THE TRUNNION DOOR IS SHOWN CLOSED

4 POINTS

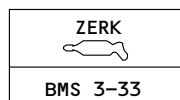
DRAG BRACE
DOOR LINKAGE



(3 LOCATIONS)

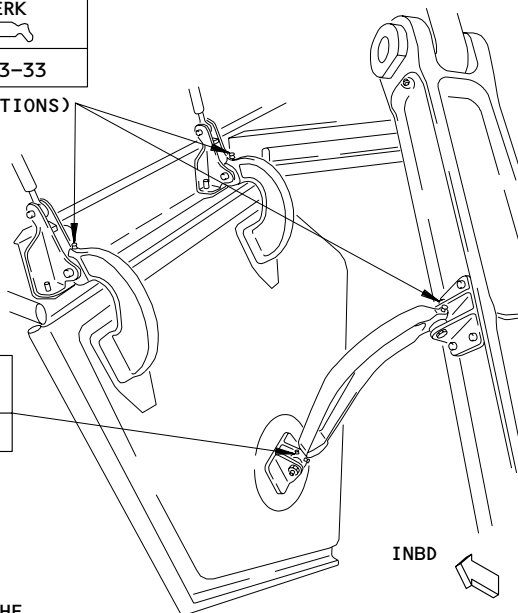
2

DRAG BRACE
DOOR LINKAGE



(1 LOCATION)

1 2



4 POINTS

(B)

1 TWO LUBE FITTINGS ARE ON THE ROD END. IT IS ONLY NECESSARY TO LUBE ONE OF THE FITTINGS

2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

4 ONE MORE LUBE POINT IS ON THE AFT HINGE (NOT SHOWN)

Lubrication for the Doors and Actuating Mechanisms of the Main Landing Gear
Figure 301 (Sheet 2)

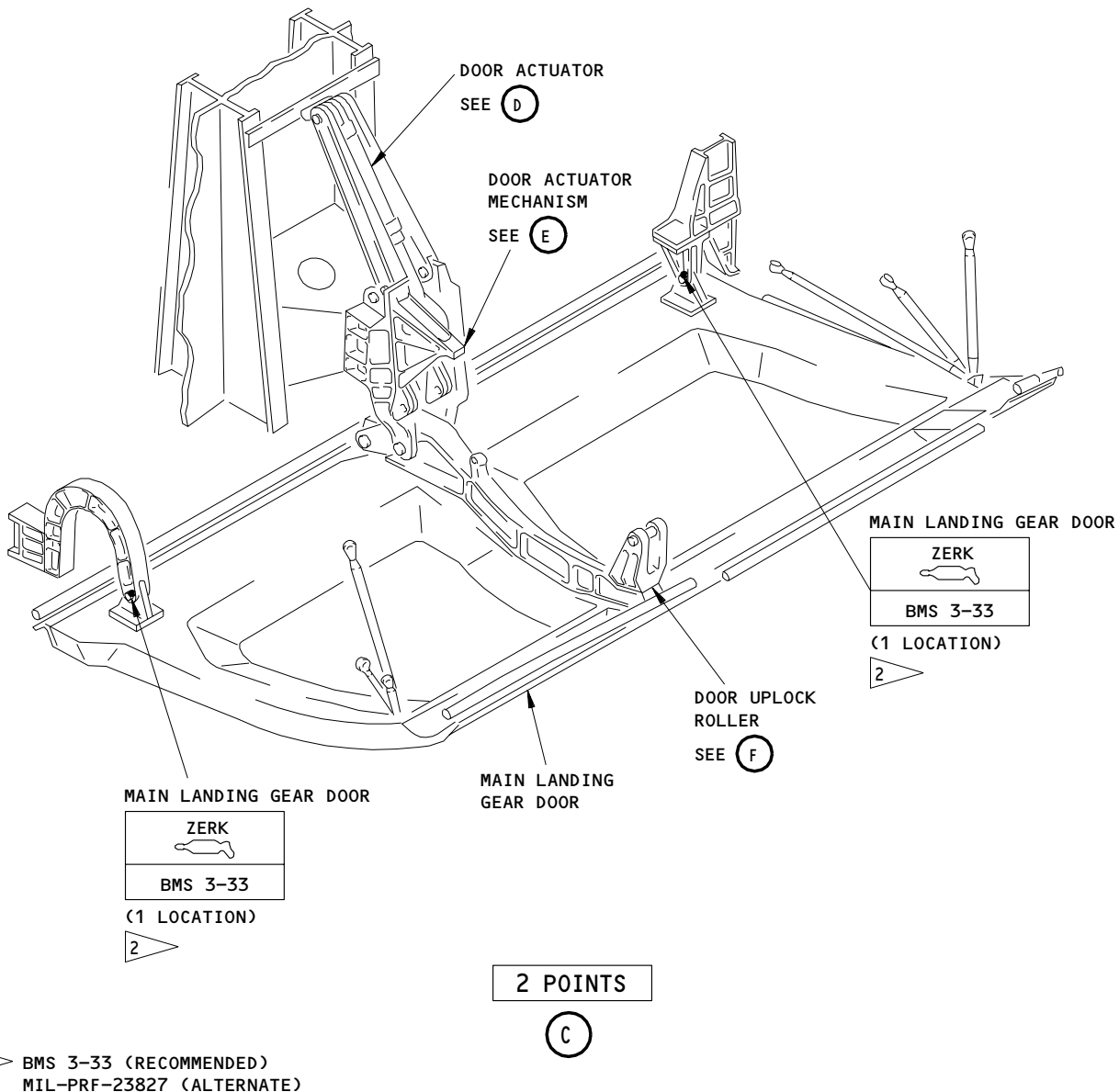
EFFECTIVITY

ALL

12-21-15

01

Page 304
Aug 22/05



Lubrication for the Doors and Actuating Mechanisms of the Main Landing Gear
Figure 301 (Sheet 3)

EFFECTIVITY	
	ALL

12-21-15

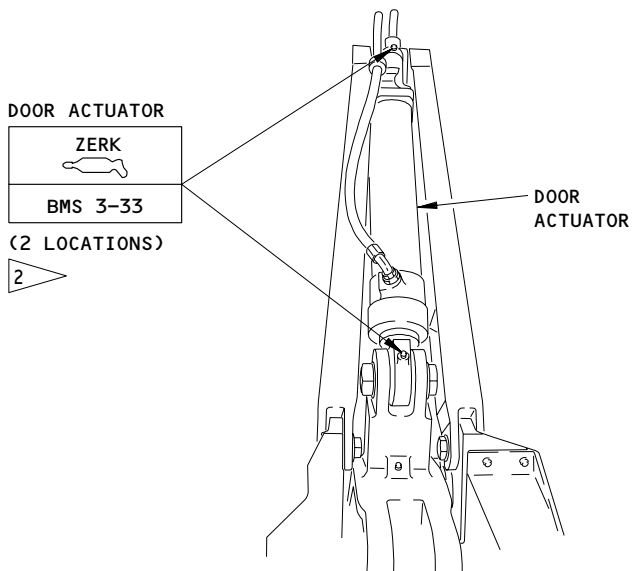
01

Page 305
Aug 22/03

332814

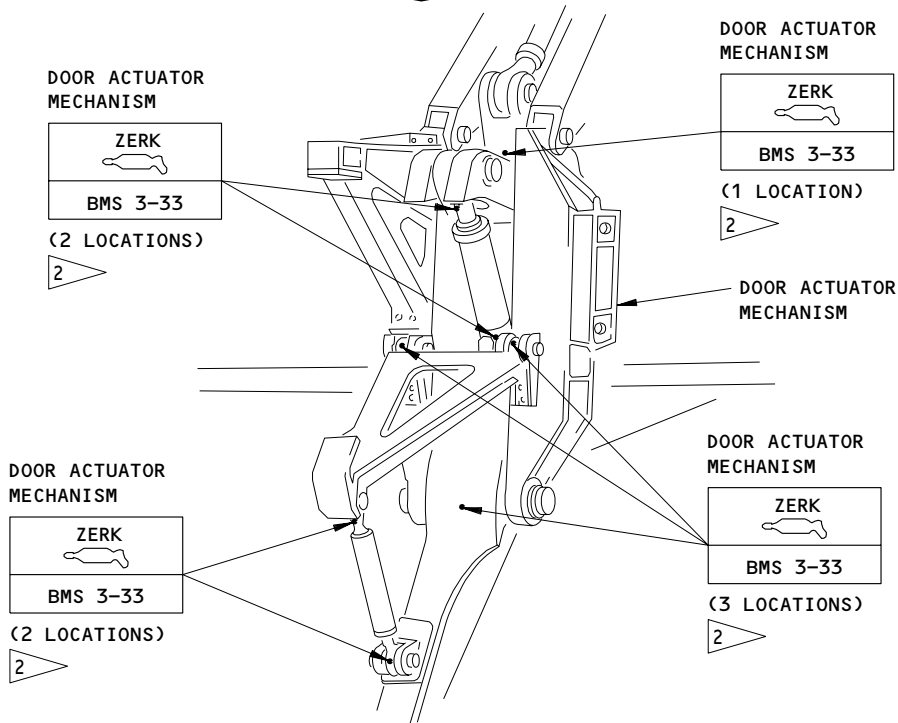
BOEING

767 MAINTENANCE MANUAL



2 POINTS

D



8 POINTS

E

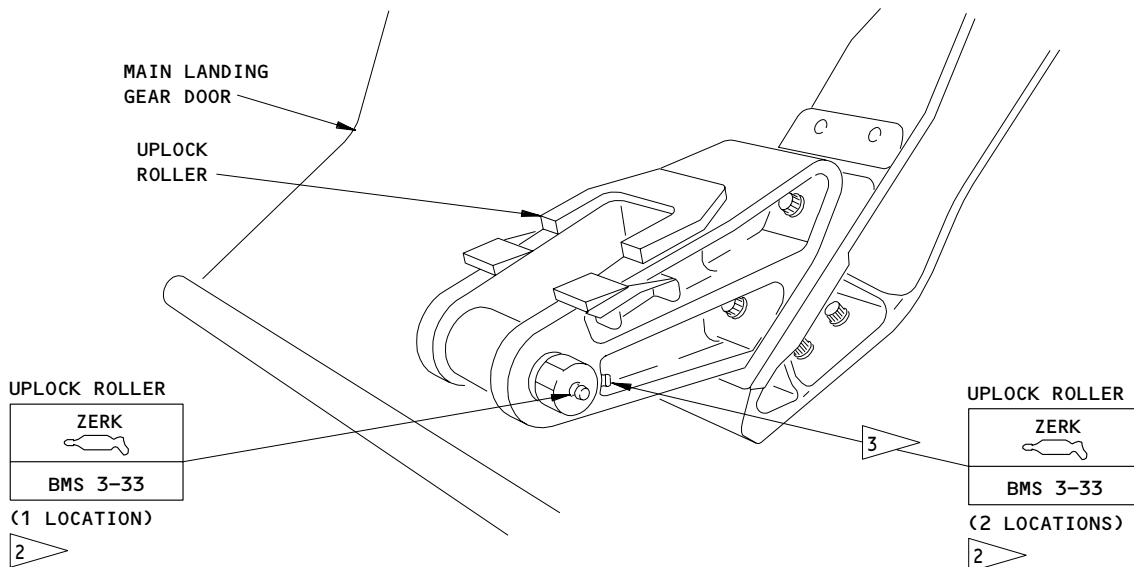
2 BMS 3-33 (RECOMMENDED)
 MIL-PRF-23827 (ALTERNATE)

Lubrication for the Doors and Actuating Mechanisms of the Main Landing Gear
Figure 301 (Sheet 4)

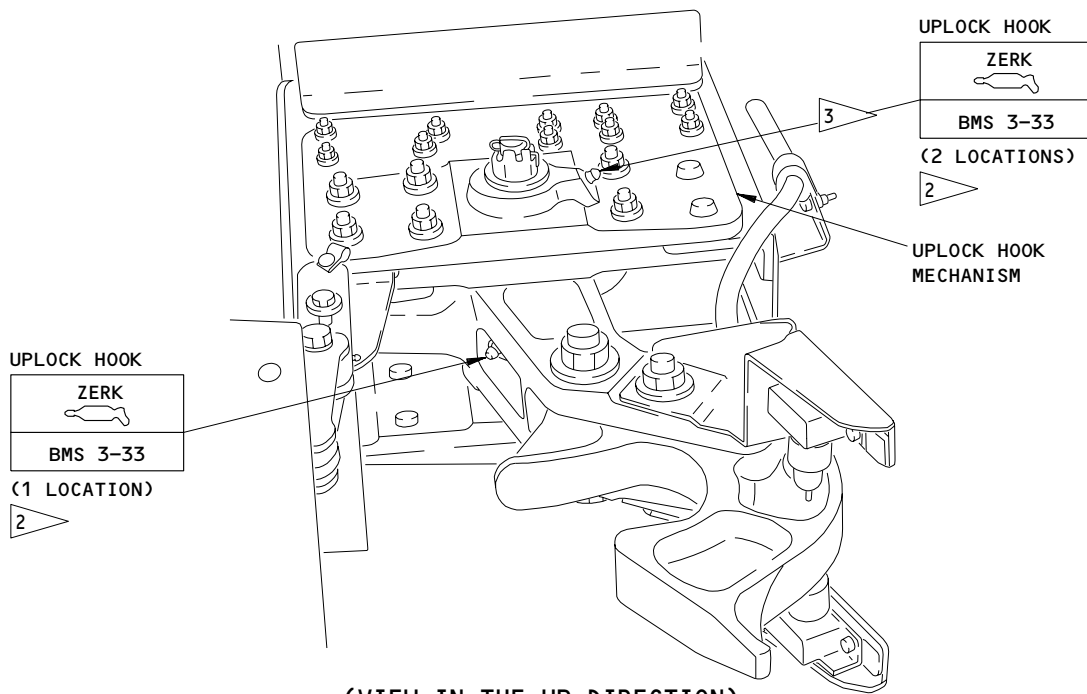
EFFECTIVITY	ALL
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12-21-15

BOEING
767
MAINTENANCE MANUAL



3 POINTS
F



(VIEW IN THE UP DIRECTION)

3 POINTS
G

- 2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)
- 3 ONE MORE LUBE POINT IS ON THE
OPPOSITE SIDE (NOT SHOWN)

Lubrication for the Doors and Actuating Mechanisms of the Main Landing Gear
Figure 301 (Sheet 5)

EFFECTIVITY	ALL
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12-21-15

TAIL SKID ACTUATING MECHANISMS – LUBRICATION

TASK 12-21-16-603-001

1. Lubricate the Tail Skid Actuating Mechanisms (Fig. 301)

A. Equipment

- (1) Retractable Tail Skid Maintenance Lock – A32088-7

B. Consumable Materials

- (1) D00633 Grease – BMS 3-33 (Preferred)
(2) D00013 Grease – MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)

C. References

- (1) AMM 06-42-00/201, Empennage (Major Zone 300) Access Doors and Panels
(2) AMM 29-11-00/201, Pressurize/Depressurize Main Hydraulic System
(3) AMM 32-00-20/201, Landing Gear Downlocks

D. Access

(1) Location Zones

- 311 Area Aft of Pressure Bulkhead (Left)
312 Area Aft of Pressure Bulkhead (Right)

(2) Access Panel

- 312AR Door – Stabilizer/Trim Jackscrew Compartment

E. Prepare to Lubricate the Tail Skid Actuating Mechanisms

S 863-005

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 863-004

- (2) Make sure the tail skid is extended.

S 863-003

- (3) Make sure the pressure is removed from the center hydraulic system and the hydraulic reservoir (AMM 29-11-00/201).

S 863-002

- (4) Open this circuit breaker on the overhead circuit breaker panel P11 and install a DO-NOT-CLOSE tag:
(a) 11U26, TAIL SKID CONT

EFFECTIVITY

ALL

12-21-16

05

Page 301
Aug 22/07

F. Procedure to Lubricate the Tail Skid Actuating Mechanisms

S 013-006

WARNING: STAY OFF THE ACCESS DOOR 312AR. THE WEIGHT OF A PERSON CAN CAUSE THE SPRING-LOADED LATCHES TO RELEASE, AND PERSONS CAN BE INJURED WHEN THEY FALL THROUGH THE OPEN DOOR.

- (1) Open the access door for the stabilizer/trim jackscrew compartment, 312AR (AMM 06-42-00/201). This permits access to the lubrication points on the tail skid support assembly.

S 493-007

- (2) Install the retractable tail skid maintenance lock around the inner cylinder of the extended shock strut/actuator.

S 643-008

- (3) Lubricate the tail skid as shown on Fig. 301.

S 093-009

- (4) Remove the retractable tail-skid-maintenance lock from the inner cylinder of the shock strut/actuator (Detail A).

S 413-010

- (5) Close the access door for the stabilizer/trim jackscrew compartment, 312AR.

S 863-011

- (6) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
 - (a) 11U26, TAIL SKID CONT

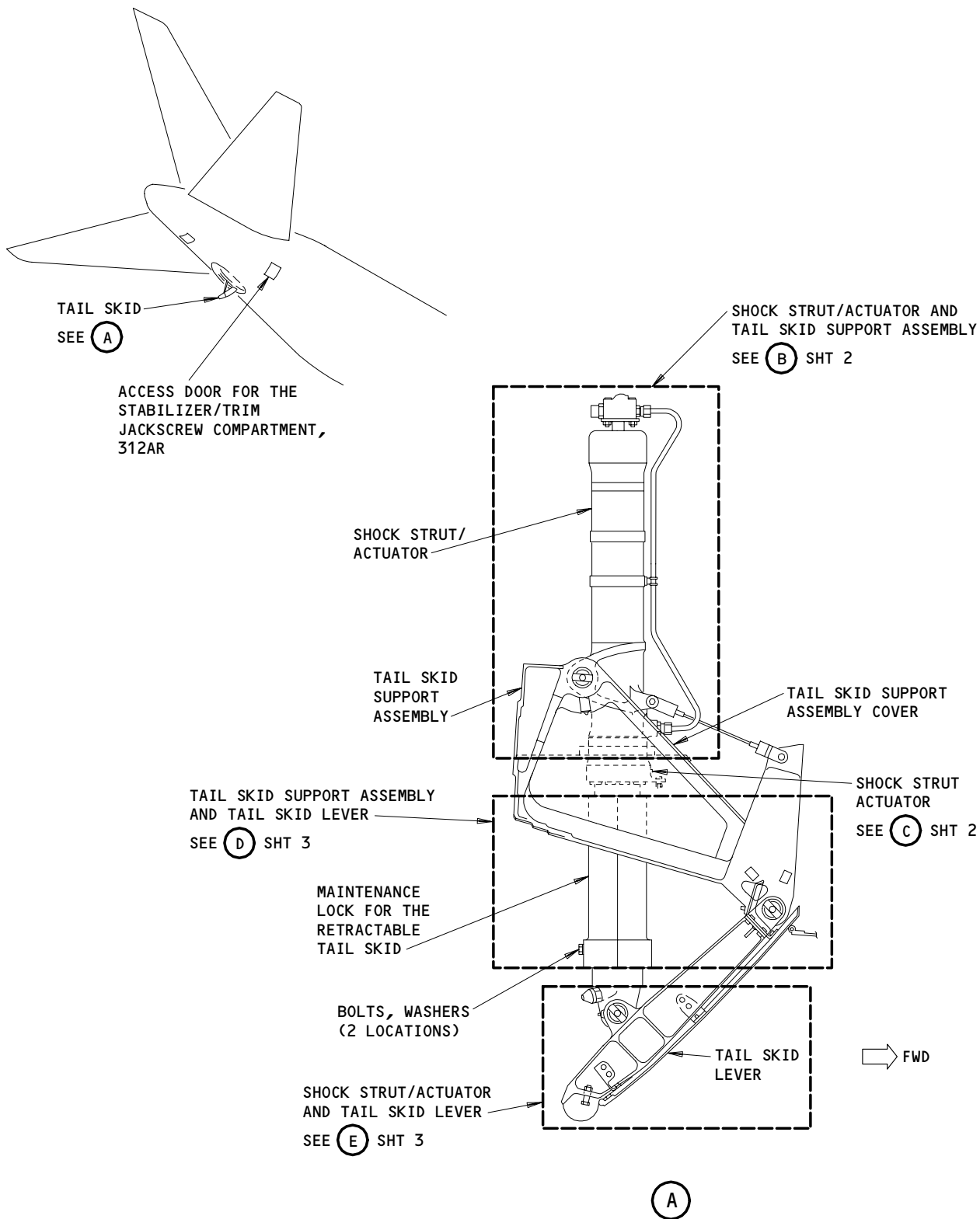
EFFECTIVITY

ALL

12-21-16

04

Page 302
Aug 22/02



Tail Skid Actuating Mechanisms - Lubrication
Figure 301 (Sheet 1)

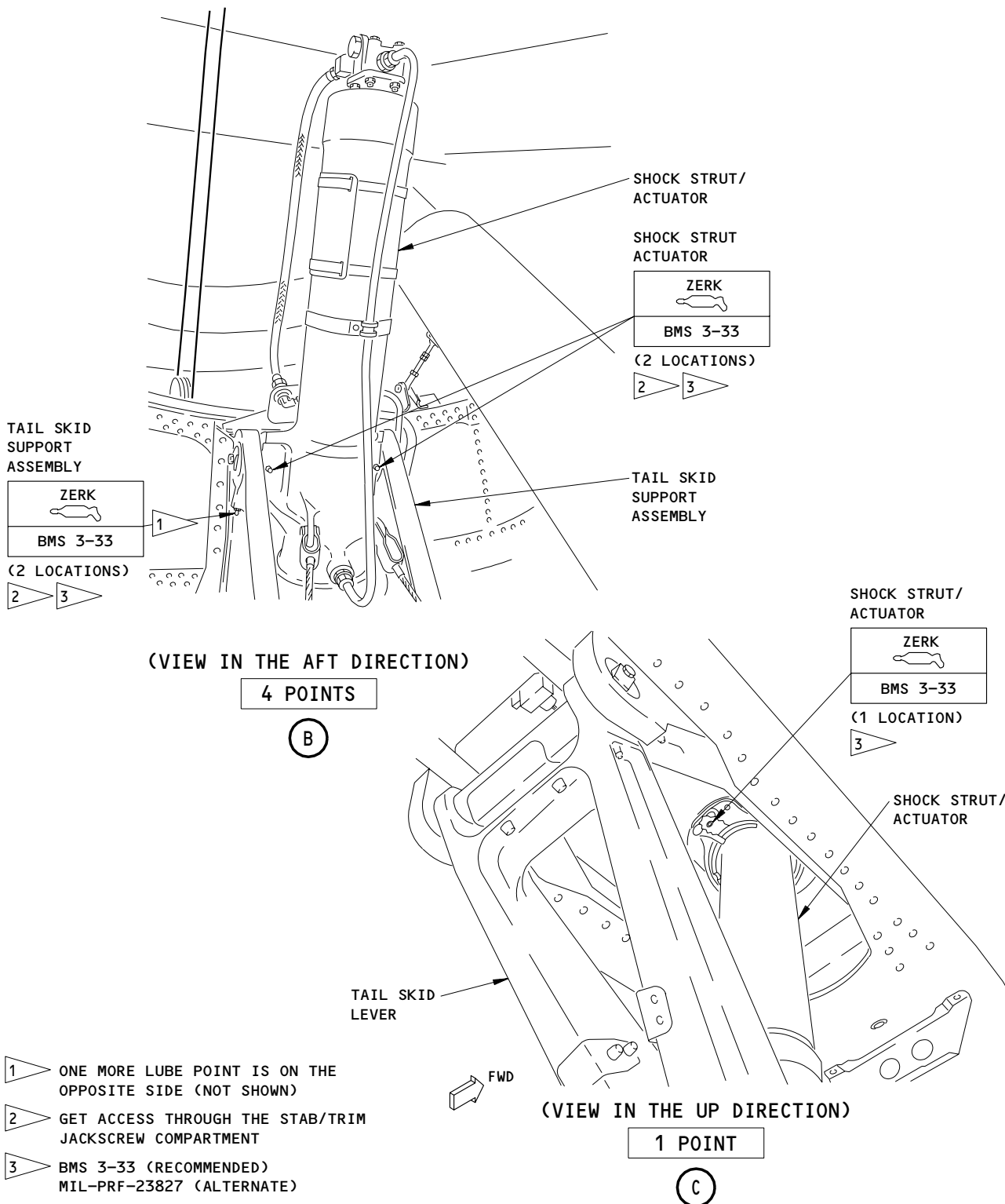
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ALL

12-21-16

02

Page 303
May 10/90

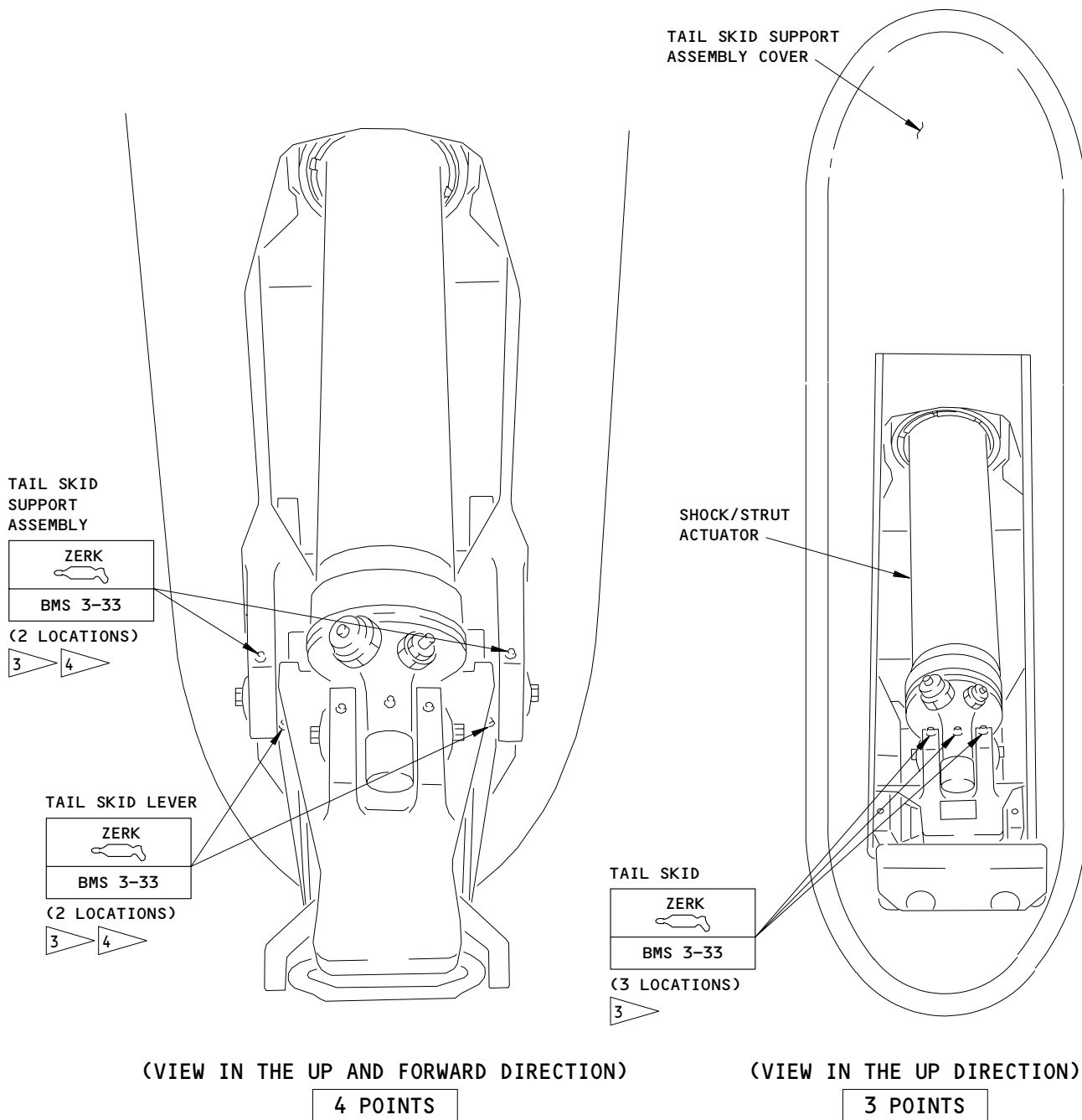


- 1 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN)
- 2 GET ACCESS THROUGH THE STAB/TRIM JACKSCREW COMPARTMENT
- 3 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Tail Skid Actuating Mechanisms - Lubrication
Figure 301 (Sheet 2)

EFFECTIVITY	
	ALL

12-21-16



- 3** BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)
- 4** SHOWN WITH TAIL SKID SUPPORT
ASSEMBLY COVER REMOVED

Tail Skid Actuating Mechanisms - Lubrication
Figure 301 (Sheet 3)

EFFECTIVITY	ALL
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12-21-16

AFT WHEEL WELL BULKHEAD AND SUPPORT FITTING SPHERICAL BEARING –
LUBRICATION

1. General

- A. This procedure contains these tasks:
- (1) The first task is to lubricate the spherical bearing on the aft wheel well bulkhead.
 - (2) The second task is to lubricate the spherical bearing of the support fitting.
- B. There are two ways to get access to the lubrication fitting on the aft wheel well bulkhead:
- (1) You can get access through the aft overwing fairing access panels, 195CL and 196CR.
 - (2) You can get access through the wheel well.
 - (3) In this procedure, the support link of the main landing gear support beam is called the support link.

TASK 12-21-17-603-008

2. Lubricate the Aft Wheel Well Bulkhead Spherical Bearing

- A. General
- (1) The procedure to lubricate the spherical bearing for the aft wheel well bulkhead can be done through the access panel on the overwing fairing (Preferred Method) or through the MLG wheel well. It is only necessary to use one of the procedures that follow.
 - (2) For airplanes with the 90 degree type Zerk fitting, the access is through the overwing fairing panel (preferred method), OR through the wheel well. For airplanes with the 45 degree type Zerk fitting, the access is through the overwing fairing panel ONLY.
- B. Equipment
- (1) Lube Fitting Tool – Aft Wheel Well Bulkhead Spherical Bearing, A12008-1 (90 Degree Fitting).
 - (2) Lube Fitting Tool – Access Panel Spherical Bearing, Snap-On YA750, YA761, or YA756 (45 Degree OR 90 Degree Fitting).
 - (3) Main Landing Gear Door Lock – A32030-6 or -12 or -18 or -21
- C. Consumable Materials
- (1) D00633 Grease – BMS 3-33 (Preferred)
 - (2) D00013 Grease – MIL-PRF-23827 (Alternate)
- D. References
- (1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
 - (2) AMM 27-51-00/201, Trailing Edge Flap System
 - (3) AMM 29-11-00/201, Main (Left, Right and Center) Hydraulic Systems
 - (4) AMM 32-00-15/201, Landing Gear Door Locks

EFFECTIVITY

ALL

12-21-17

- (5) AMM 32-00-20/201, Landing Gear Downlocks
E. Access

- (1) Location Zones
143 MLG Wheel Well (Left)
144 MLG Wheel Well (Right)
- (2) Access Panels
195CL Overwing Fairing (Left)
196CR Overwing Fairing (Right)

- F. Procedure - Lubricate the Spherical Bearing through the Access Panel (Preferred Method).

S 433-015

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE TRAILING EDGE FLAPS OR MOVE ALL PERSONS AND EQUIPMENT AWAY WHEN YOU WORK NEAR THE TRAILING EDGE (T/E) FLAPS. THE T/E FLAPS CAN EXTEND OR RETRACT QUICKLY AND CAUSE DAMAGE TO EQUIPMENT AND INJURY TO PERSONS IF YOU DO NOT DO THE DEACTIVATION PROCEDURE.

- (1) Do the deactivation procedure for the trailing edge flaps (AMM 27-51-00/201) as follows before you do the lubrication task:
(a) Open these circuit breakers on the main power distribution panel, P6, and attach circuit breaker locks and DO-NOT-CLOSE tags:
1) 6D21, ALTN SLAT INBD PWR
2) 6D24, ALTN FLAP PWR
3) 6F24, ALTN SLAT OUTBD PWR

S 863-011

- (2) Open these circuit breakers on the overhead panel, P11, and attach circuit breaker locks and DO-NOT-CLOSE tags:
(a) 11H23, SLAT ALTN CONT INBD
(b) 11H24, SLAT ALTN CONT OUTBD
(c) 11J24, FLAPS ALTN CONT

S 043-012

- (3) Remove the power from the center hydraulic system if it is not necessary (AMM 29-11-00/201).

S 013-004

- (4) Remove the access panel (195CL, 196CR) that is forward of the off-wing slide door as shown in Figure 302 (AMM 06-41-00/201).

EFFECTIVITY

ALL

12-21-17

02

Page 302
Dec 22/05

S 493-005

- (5) Attach a flexible grease gun hose to the recommended tool to lubricate the grease fitting.

NOTE: The lubrication fitting is on the aft face of the bulkhead side fitting. It is above and slightly outboard of the bearing.

S 643-006

- (6) Apply grease to the lubrication fitting.

S 413-007

- (7) Install the access panel.

NOTE: Ensure that fasteners have the minimum locking torque for self-locking nuts (AMM 20-11-00/201).

G. Procedure - Lubricate the Spherical Bearing through the Wheel Well

S 493-001

WARNING: MAKE SURE THE DOWNLOCKS ARE INSTALLED IN ALL OF THE LANDING GEAR. WITHOUT THE DOWNLOCKS, THE LANDING GEAR COULD RETRACT AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Make sure the downlocks are installed on the nose and main landing gear (AMM 32-00-20/201).

S 863-025

WARNING: OBEY THE INSTALLATION PROCEDURE FOR THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Open the doors for the main landing gear and install the door locks (AMM 32-00-15/201).

S 643-002

CAUTION: BE CAREFUL WHEN YOU DISENGAGE THE GREASE GUN FROM THE LUBRICATION FITTING. DAMAGE TO LUBRICATION FITTING CAN EASILY OCCUR.

- (3) Lubricate the spherical bearing as shown on Fig. 301.

NOTE: To lubricate the spherical bearing, get access to the fitting through the clearance between the airplane structure and the link on the inboard end of the main landing gear beam.

EFFECTIVITY

ALL

12-21-17

01

Page 303
Aug 22/05

TASK 12-21-17-123-016

3. Spherical Bearing Support Fitting Lubrication (Fig. 303)

A. Procedure

S 643-017

- (1) Lubricate the spherical bearing in the support fitting as shown in Figure 303.

S 863-013

- (2) Remove the DO-NOT-CLOSE tags and the circuit breaker locks, and close these circuit breakers on the main power distribution panel, P6:

(a) 6D21, ALTN SLAT INBD PWR

(b) 6D24, ALTN FLAP PWR

(c) 6F24, ALTN SLAT OUTBD PWR

S 863-014

- (3) Remove the DO-NOT-CLOSE tags and the circuit breaker locks and close these circuit breakers on the overhead panel, P11:

(a) 11H23, SLAT ALTN CONT INBD

(b) 11H24, SLAT ALTN CONT OUTBRD

(c) 11J24, FLAPS ALTN CONT

S 093-003

WARNING: USE THE PROCEDURE IN AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS. THE DOORS OPEN AND CLOSE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Remove the door locks from the main landing gear doors and close the doors (AMM 32-00-15/201).

EFFECTIVITY

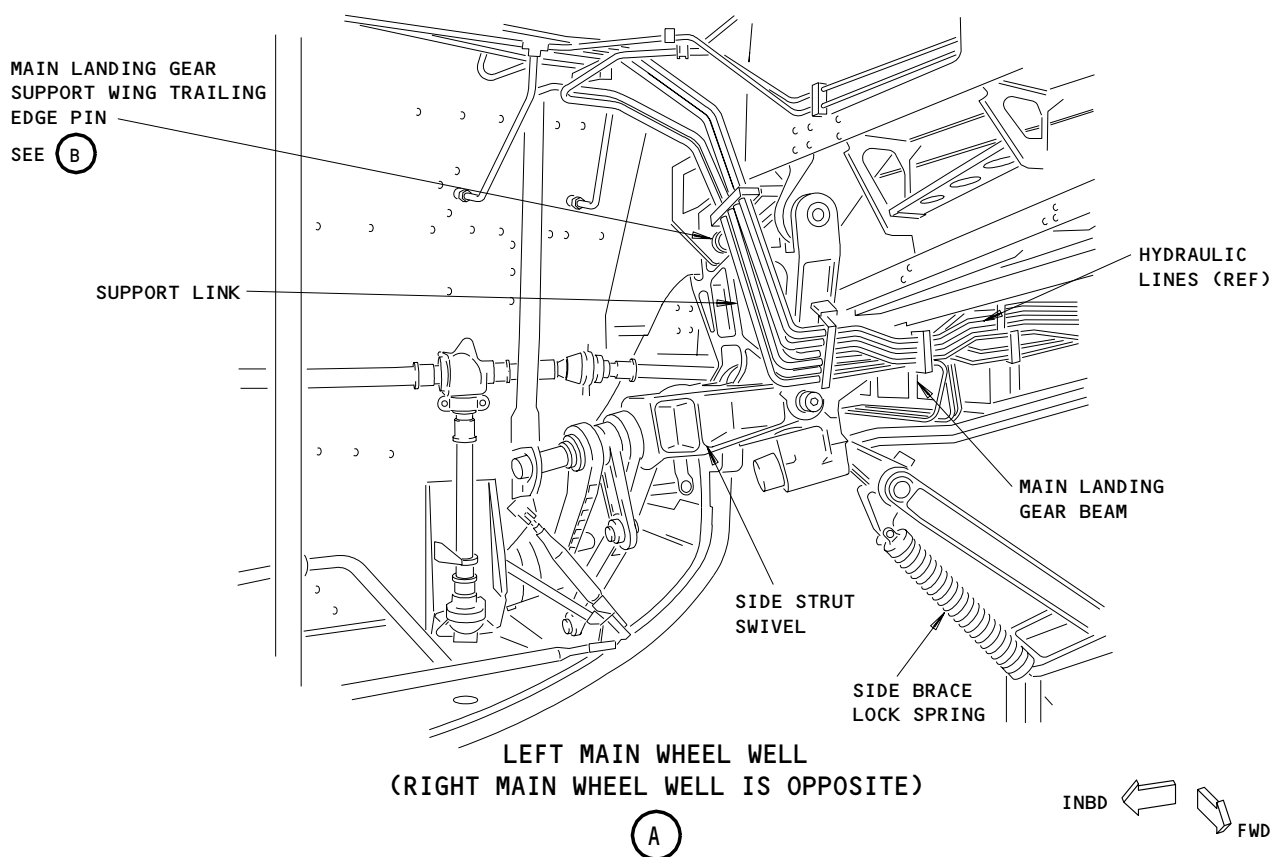
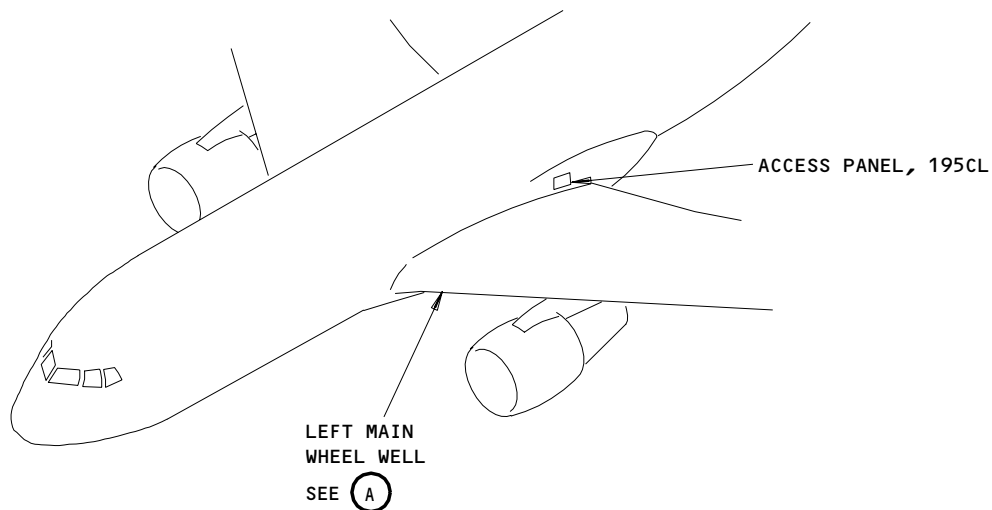
ALL

12-21-17

01

Page 304
Apr 22/04

BOEING
767
MAINTENANCE MANUAL



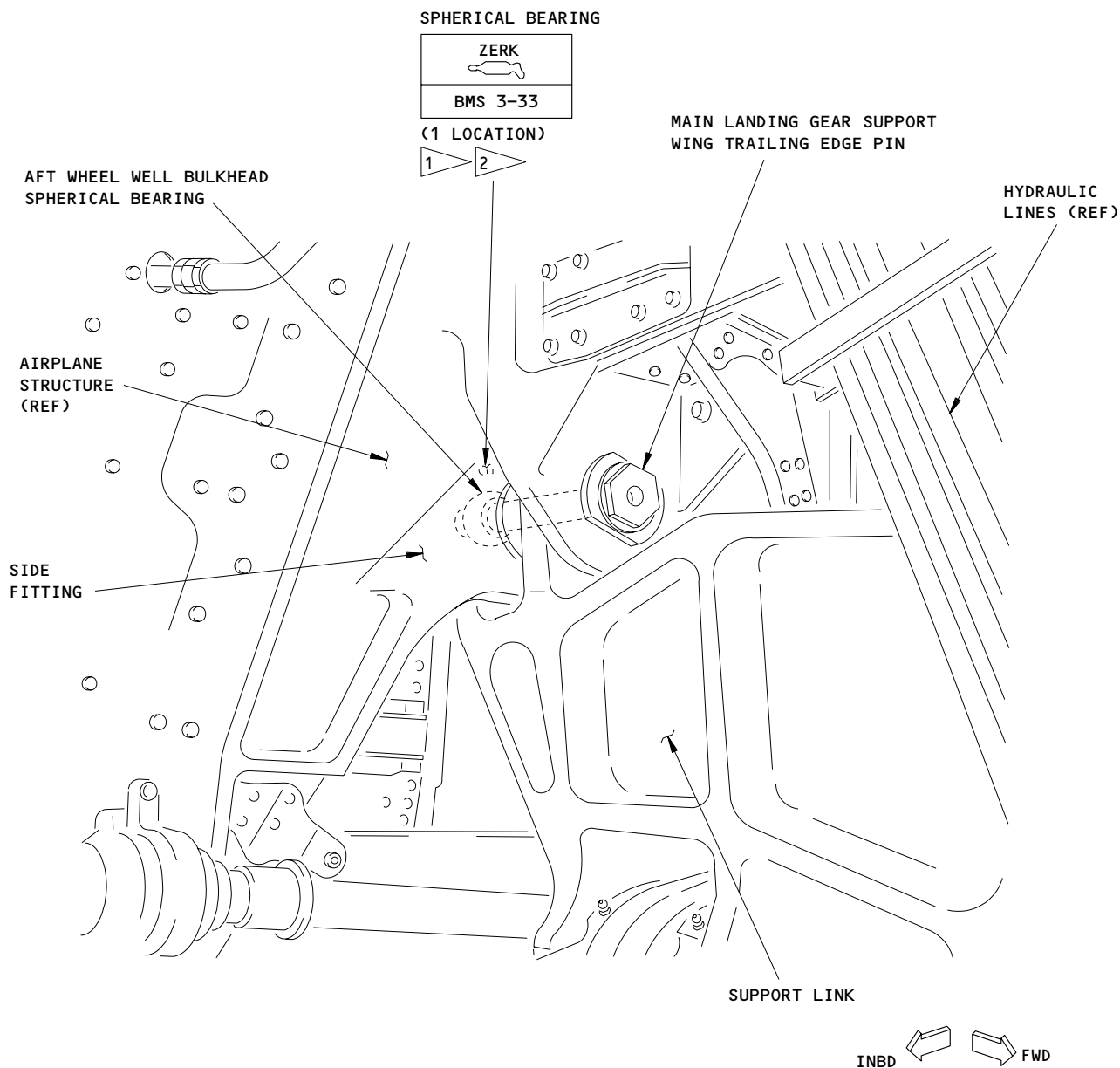
Aft Wheel Well Bulkhead Spherical Bearing Lubrication - Wheel Well Access
Figure 301 (Sheet 1)

EFFECTIVITY
767-200 AND 767-300

12-21-17

01

Page 305
Aug 22/99



MAIN LANDING GEAR SUPPORT WING TRAILING EDGE PIN

1 POINT

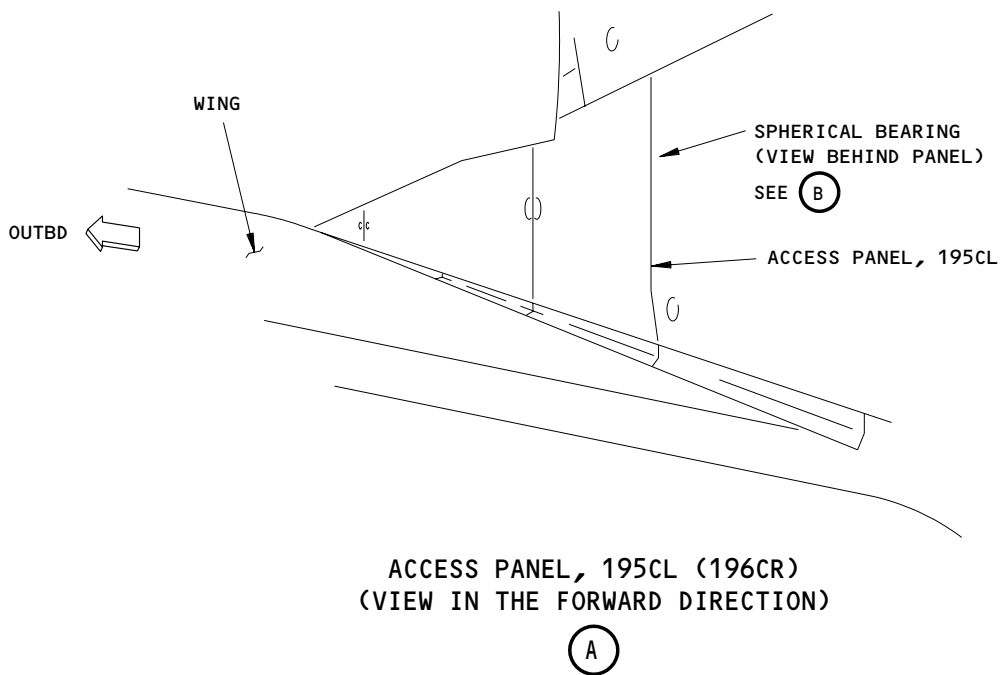
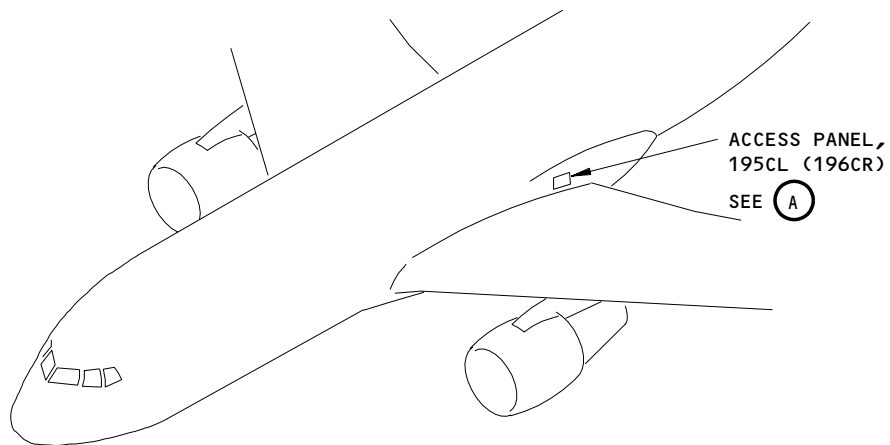
(B)

- 1 THE LUBRICATION FITTING IS ON THE AFT SIDE OF THE SIDE FITTING.
- 2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

**Aft Wheel Well Bulkhead Spherical Bearing Lubrication - Wheel Well Access
Figure 301 (Sheet 2)**

EFFECTIVITY
767-200 AND 767-300

12-21-17



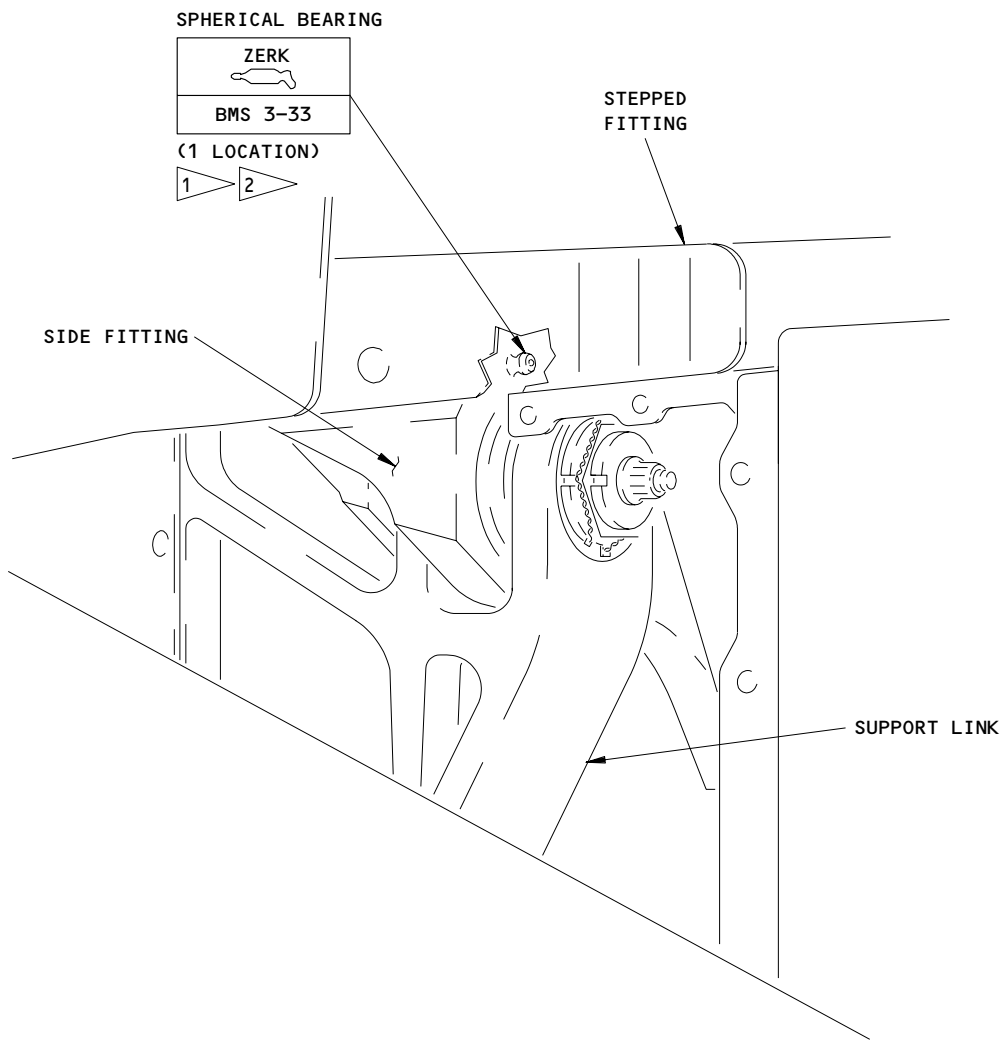
Aft Wheel Well Bulkhead Spherical Bearing Lubrication - Panel Access
Figure 302 (Sheet 1)

EFFECTIVITY
767-200 AND 767-300

12-21-17

01

Page 307
Aug 22/08



SPHERICAL BEARING

1 POINT

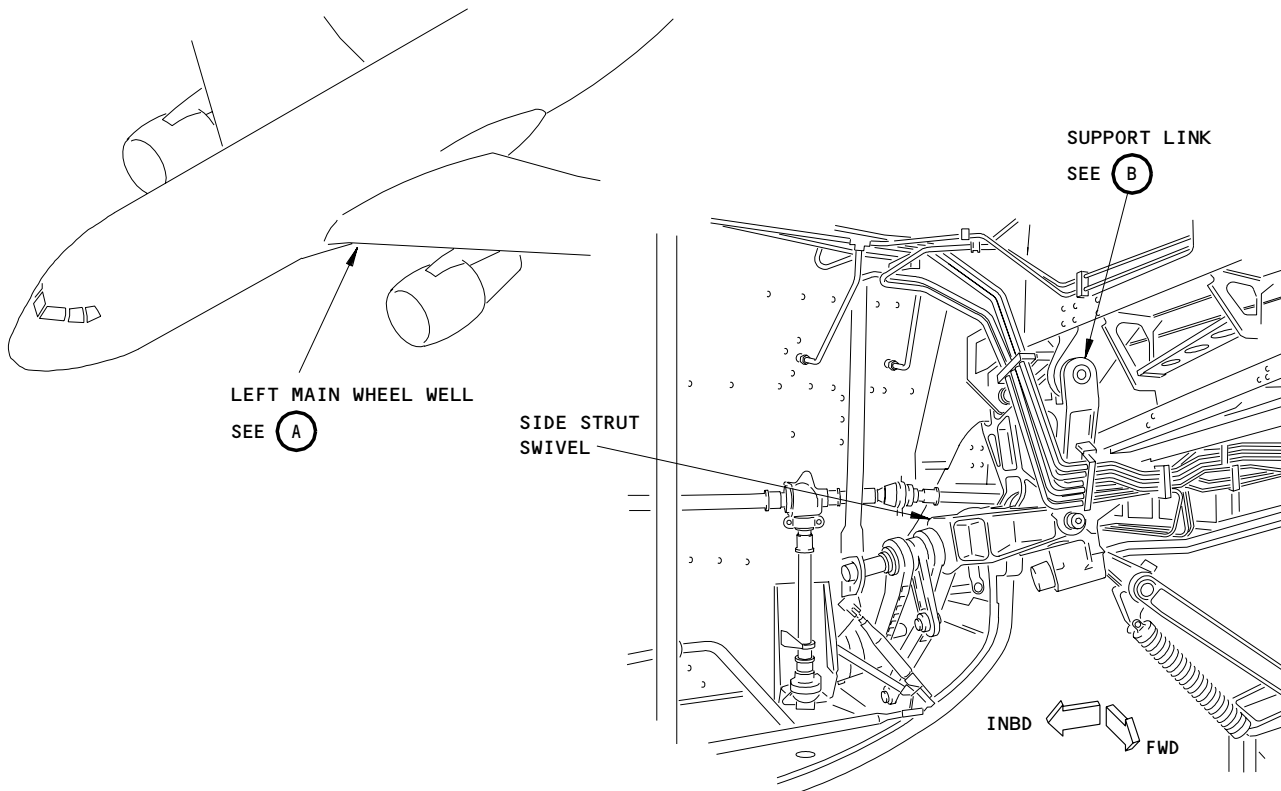
(B)

- 1 LUBRICATION FITTING LOCATED BEHIND THE STEPPED FITTING SHOWN IN THE CUTAWAY VIEW.
- 2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

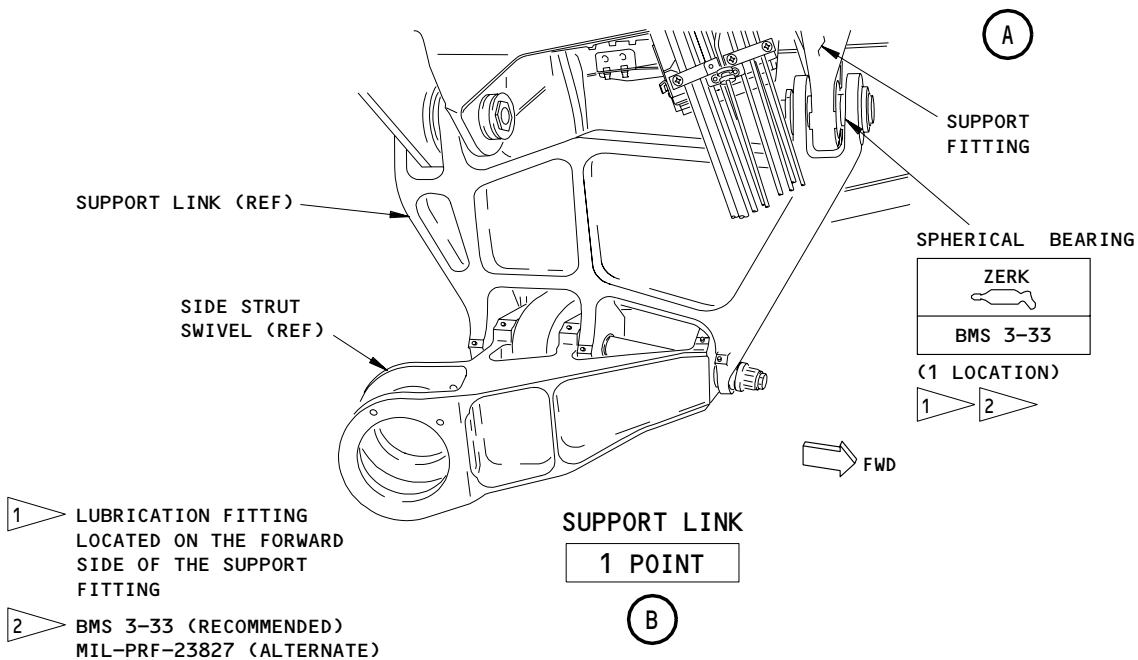
Aft Wheel Well Bulkhead Spherical Bearing Lubrication - Panel Access
Figure 302 (Sheet 2)

EFFECTIVITY
767-200 AND 767-300

12-21-17



LEFT MAIN WHEEL WELL
(RIGHT MAIN WHEEL WELL IS OPPOSITE)



Spherical Bearing Support Fitting Lubrication
Figure 303

EFFECTIVITY
767-200 AND 767-300

12-21-17

ENTRY DOOR – SERVICING

1. General

- A. This procedure has the lubrication tasks for all Type-1 entry doors.
- B. This procedure gives the instructions to lubricate the entry/service doors and tracks.

TASK 12-21-18-603-001

2. Door Lubrication (Fig. 301)

A. Consumable Materials

- (1) D00633 Grease – BMS 3-33 (Preferred)
- (2) D00013 Grease – MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)
- (3) D00015 Grease – BMS 3-24 (Alternate)
- (4) D00189 Lubricant – Silicone Based, Dow Corning 111
- (5) D00650 Lubricant – High Vacuum Grease, Dow Corning 976V

B. References

- (1) AMM 25-22-03/401, Moveable Ceiling Panels
- (2) AMM 25-66-03/401, Entry/Service Door Escape System Deployment Mechanism

C. Access

- (1) Location Zones
 - 831 Forward Entry Door
 - 833 Aft Entry Door
 - 841 Forward Service Door
 - 843 Aft Service Door

D. Procedure

S 013-002

- (1) Remove the moveable ceiling panel (AMM 25-22-03/401).

S 643-003

- (2) Apply grease to the full length of the sliding surfaces on the floating roller guide assembly.

NOTE: The floating roller is on the left side, when you look outboard, of all of the entry/service doors.

S 643-004

- (3) Apply grease only to the door track and the trolley track surfaces that touch the rollers, and wipe almost dry with a clean cloth.

EFFECTIVITY

ALL

12-21-18

03.1

Page 301
Aug 22/09

S 643-019

- (4) Apply grease to the latch roller bearings (Fig. 301).

S 643-017

- (5) If necessary, lubricate the girt bar carrier assembly as follows (Fig. 303):

NOTE: Lubrication of the girt bar carrier assembly is recommended to prevent it from moisture freezing.

- (a) Apply the Dow Corning 111 or 976V compound to the girt bar carrier bearings, inside the surface of bearing cavity, and to all surface of the lock arm shaft before you assemble the girt bar carrier (AMM 25-66-03/401).
- (b) Clean excess grease from assembled girt bar carrier and clean the drain holes.

S 413-005

- (6) Install the moveable ceiling panel (AMM 25-22-03/401).

TASK 12-21-18-603-009

3. Handle Lubrication (Fig. 302)

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
(2) D00013 Grease - MIL-PRF-23827 (Supersedes MIL-G-23827) (Alternate)

B. Access

(1) Location Zones

831	Forward Entry Door
833	Aft Entry Door
841	Forward Service Door
843	Aft Service Door

C. Procedure

S 643-008

- (1) Apply a light film of grease to all surfaces of the moving pin before installation.

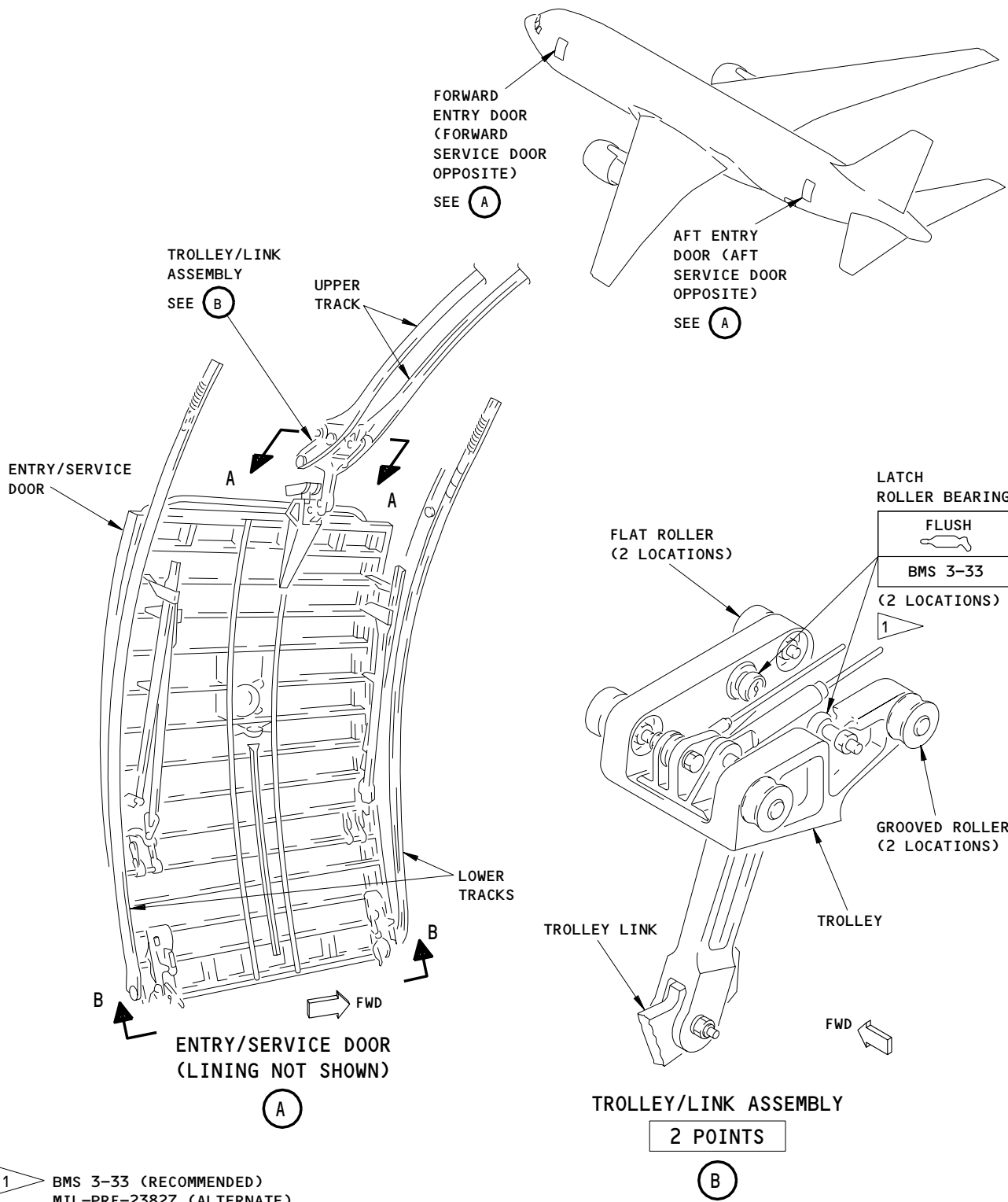
EFFECTIVITY

ALL

12-21-18

01.1

Page 302
Aug 22/09



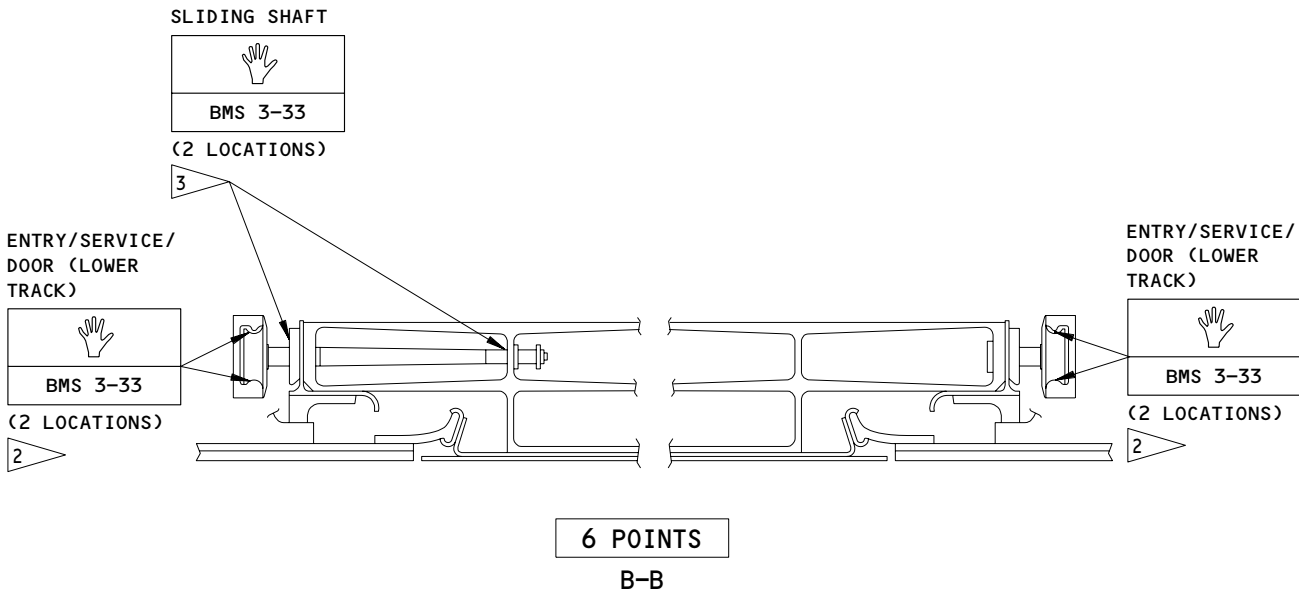
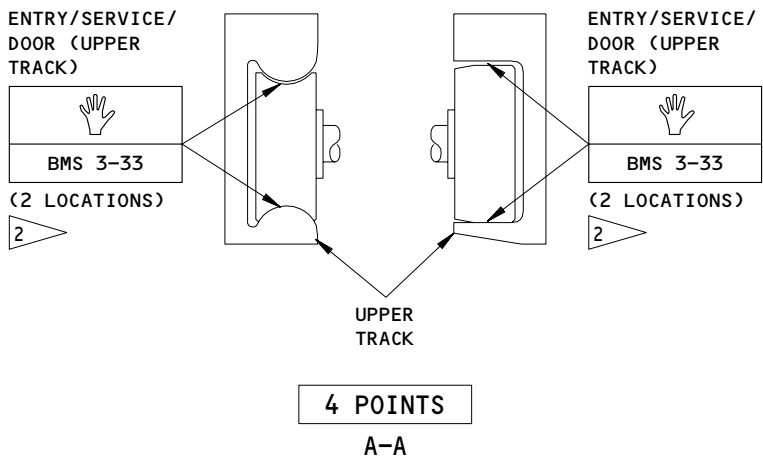
Entry/Service Door Lubrication
Figure 301 (Sheet 1)

EFFECTIVITY	
	ALL

12-21-18

01

Page 303
Apr 22/04



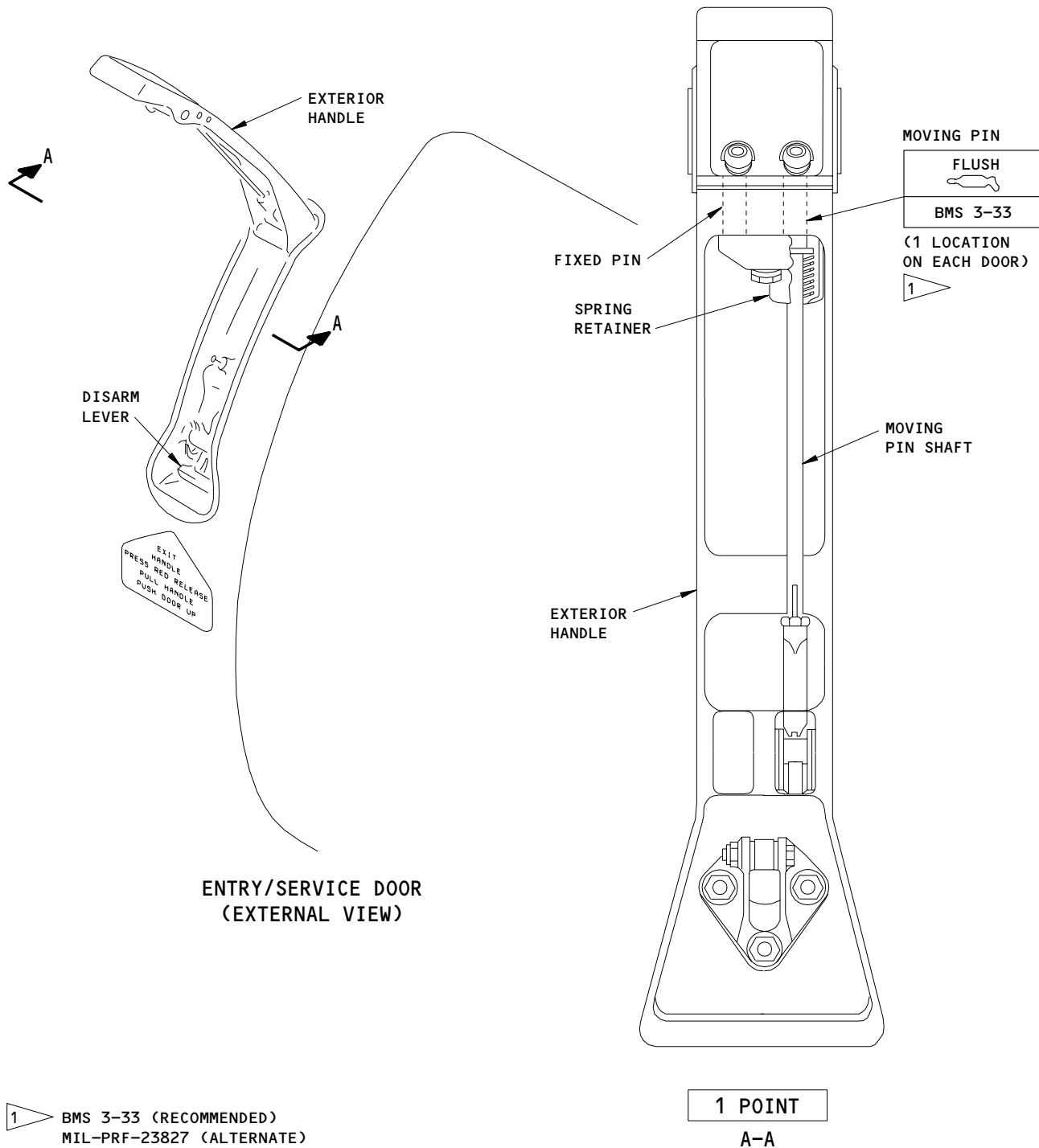
- 2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)
- 3 BMS 3-33 (RECOMMENDED)
BMS 3-24 (ALTERNATE)

Entry/Service Door Lubrication
Figure 301 (Sheet 2)

EFFECTIVITY	ALL
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12-21-18

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1 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Entry/Service Door Exterior Handle Servicing
Figure 302

EFFECTIVITY

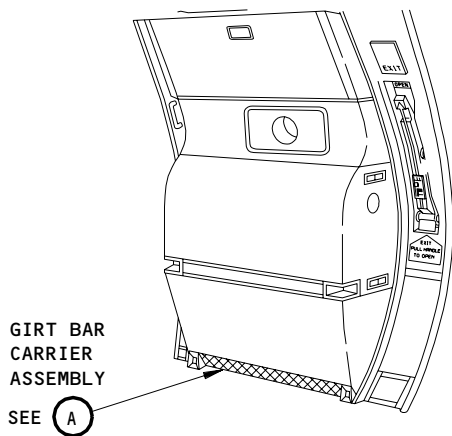
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12-21-18

01


Page 305
Aug 22/03

FD0906




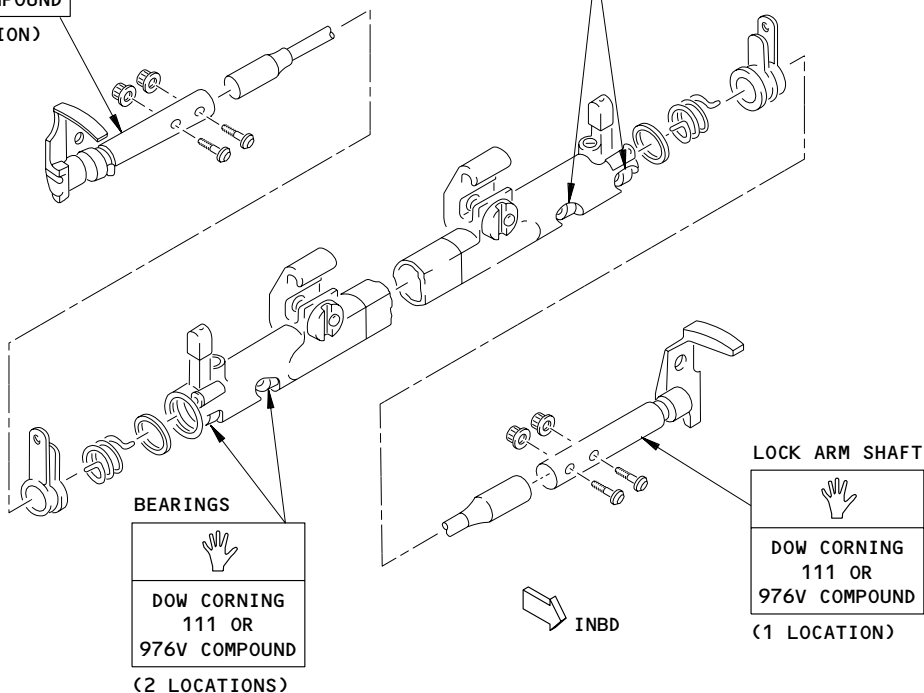
ENTRY/SERVICE DOOR
(EXAMPLE)

LOCK ARM SHAFT


DOW CORNING
111 OR
976V COMPOUND
(1 LOCATION)

BEARINGS


DOW CORNING
111 OR
976V COMPOUND
(2 LOCATIONS)



GIRT BAR CARRIER ASSEMBLY
(DISARMED POSITION)

6 POINTS

(A)

Girt Bar Carrier Lubrication
Figure 303

EFFECTIVITY

ALL

12-21-18

01

Page 306
Dec 22/99

OFF-WING ESCAPE SYSTEM – SERVICING

1. General

- A. This procedure contains one task. The task is to lubricate the off-wing escape system.

TASK 12-21-19-643-001

2. Lubricate the Off-Wing Escape System

A. Consumable Materials

- (1) D00121 Lubricant – Grease DC33

B. Access

- (1) Location Zones

195/196 Wing-to-Body Fairings – Aft Upper Half

- (2) Access Panels

195EL/196ER Off-Wing Escape Slide Compartment Door

195ML/196MR Integrator Access Door

195QL/196QR Latch-Opening Actuator Access Door

C. Procedure – Lubricate the Off-Wing Escape System (Fig. 301)

S 013-002

WARNING: YOU MUST OBEY THE PROCEDURE TO OPEN THE OFF-WING ESCAPE SLIDE COMPARTMENT DOOR. IF YOU INCORRECTLY OPEN THE OFF-WING ESCAPE SLIDE COMPARTMENT DOOR, THE ESCAPE SLIDE CAN ACCIDENTALLY INFLATE AND CAUSE INJURY OR DAMAGE.

- (1) Open the off-wing escape slide compartment door.

S 013-003

- (2) Open the integrator access door.

S 643-004

CAUTION: DO NOT APPLY LUBRICANT ON THE SLIDE COMPARTMENT DOOR LATCHES. THE LATCHES ARE DRY LUBRICATED AND ADDITIONAL LUBRICATION IS NOT NECESSARY. DAMAGE TO THE SLIDE COMPARTMENT DOOR CAN OCCUR IF LUBRICATION THAT IS NOT NECESSARY IS ADDED.

- (3) Apply a thin layer of lubricant on the subsequent areas (Fig. 301):

(a) All the surfaces of the joints that can move or turn and all surfaces of the joints that you can see

(b) All surfaces that are not painted:

- 1) Inflation cylinder disarm mechanism
- 2) Inflation cylinder trigger actuating mechanism
- 3) Cover release and disarm mechanism
- 4) Linkage to door opening actuators
- 5) Integrator

EFFECTIVITY

ALL

12-21-19

02

Page 301
Dec 22/06

S 413-005

WARNING: YOU MUST OBEY THE PROCEDURE TO CLOSE THE OFF-WING ESCAPE SLIDE COMPARTMENT DOOR. IF YOU INCORRECTLY CLOSE THE OFF-WING ESCAPE SLIDE COMPARTMENT DOOR, THE ESCAPE SLIDE CAN ACCIDENTALLY INFLATE AND CAUSE INJURY OR DAMAGE.

(4) Close the off-wing escape slide compartment door.

S 413-006

(5) Close the integrator access door.

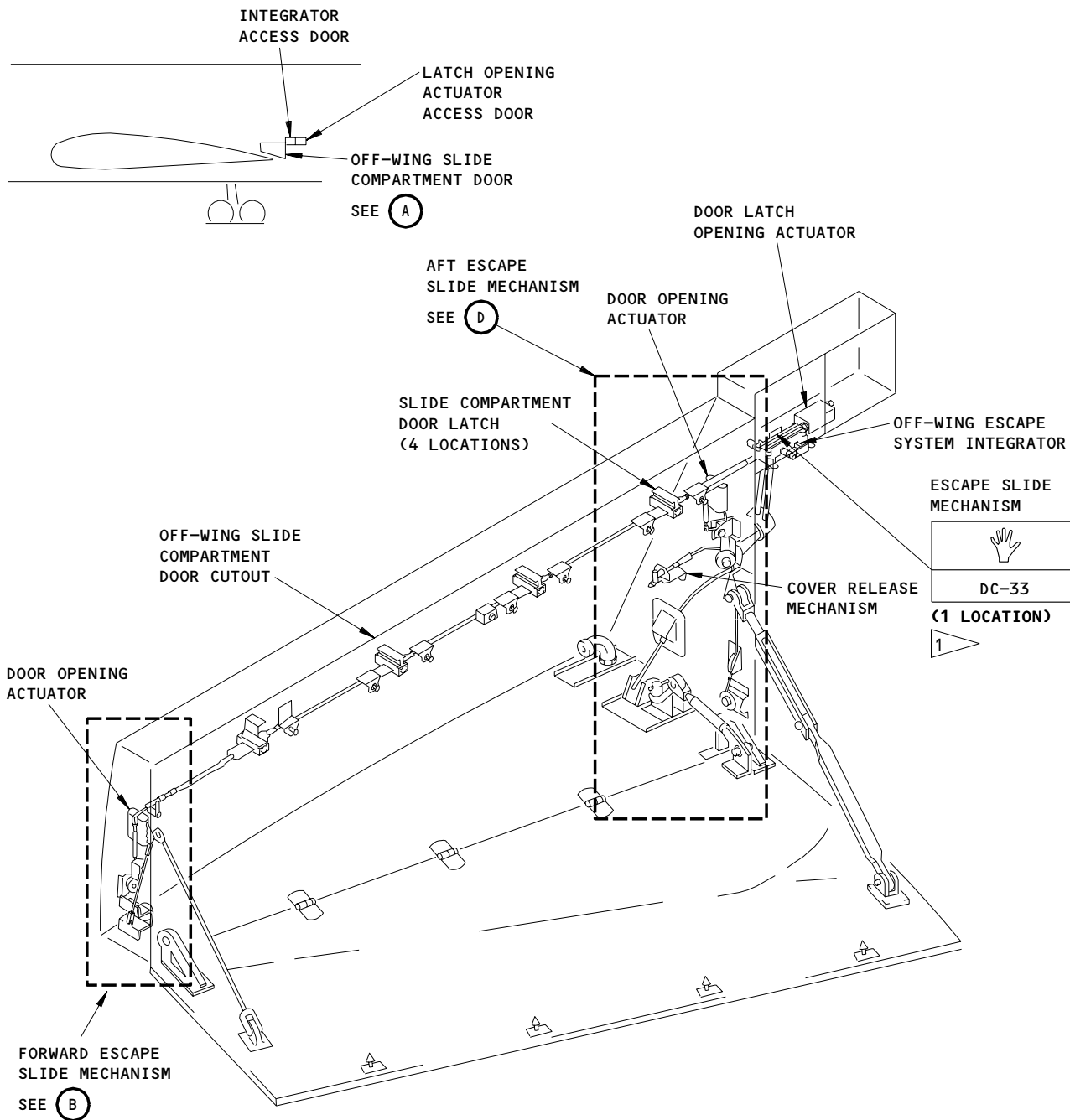
EFFECTIVITY

ALL

12-21-19

01

Page 302
Dec 22/06



(LEFT SIDE OFF-WING ESCAPE SYSTEM IS SHOWN,
RIGHT SIDE SYSTEM IS OPPOSITE)

1 POINT

A

1 ONLY USE THIS LUBRICANT

Off-Wing Escape System Lubrication
Figure 301 (Sheet 1)

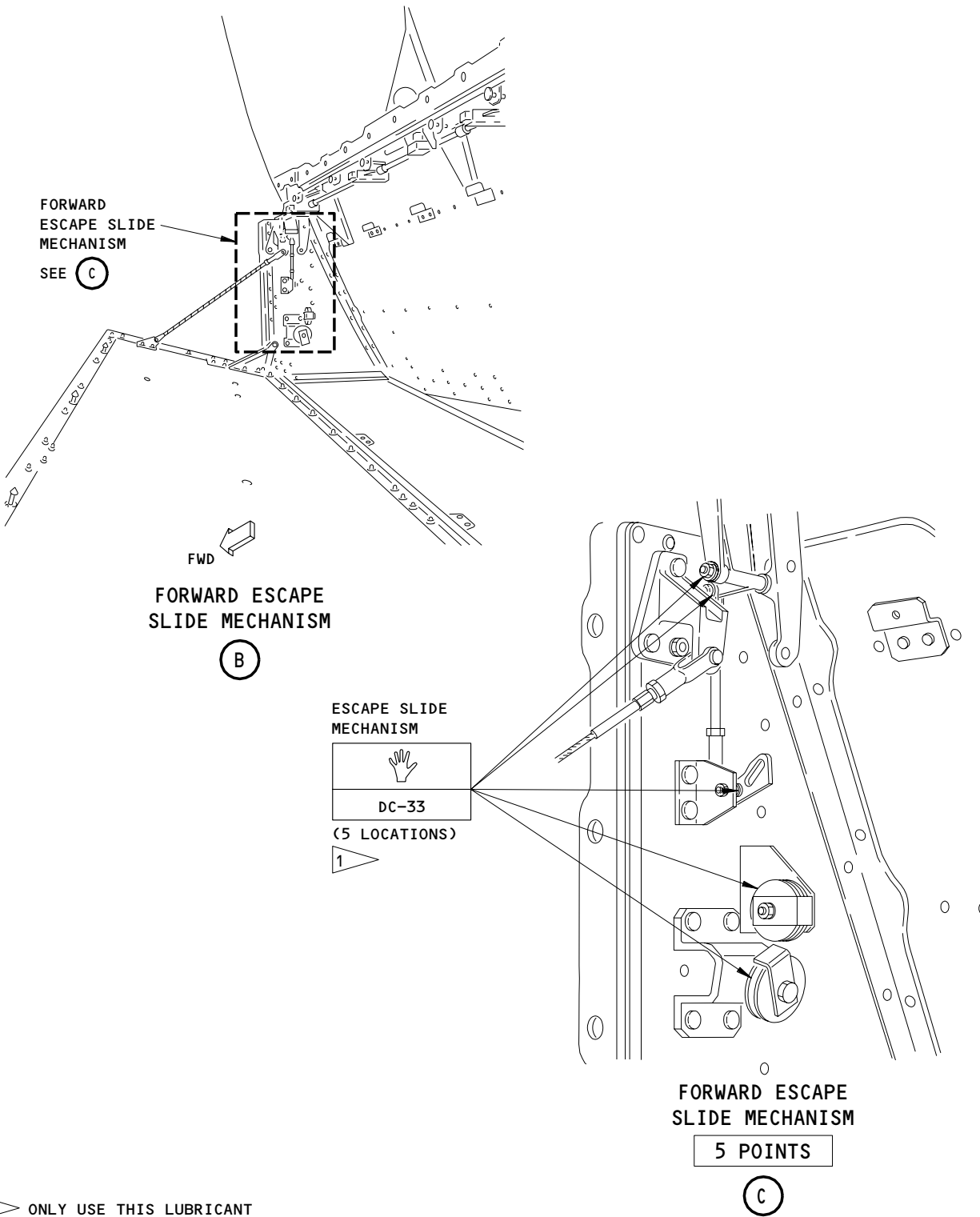
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	ALL

12-21-19

02

Page 303
Aug 22/05

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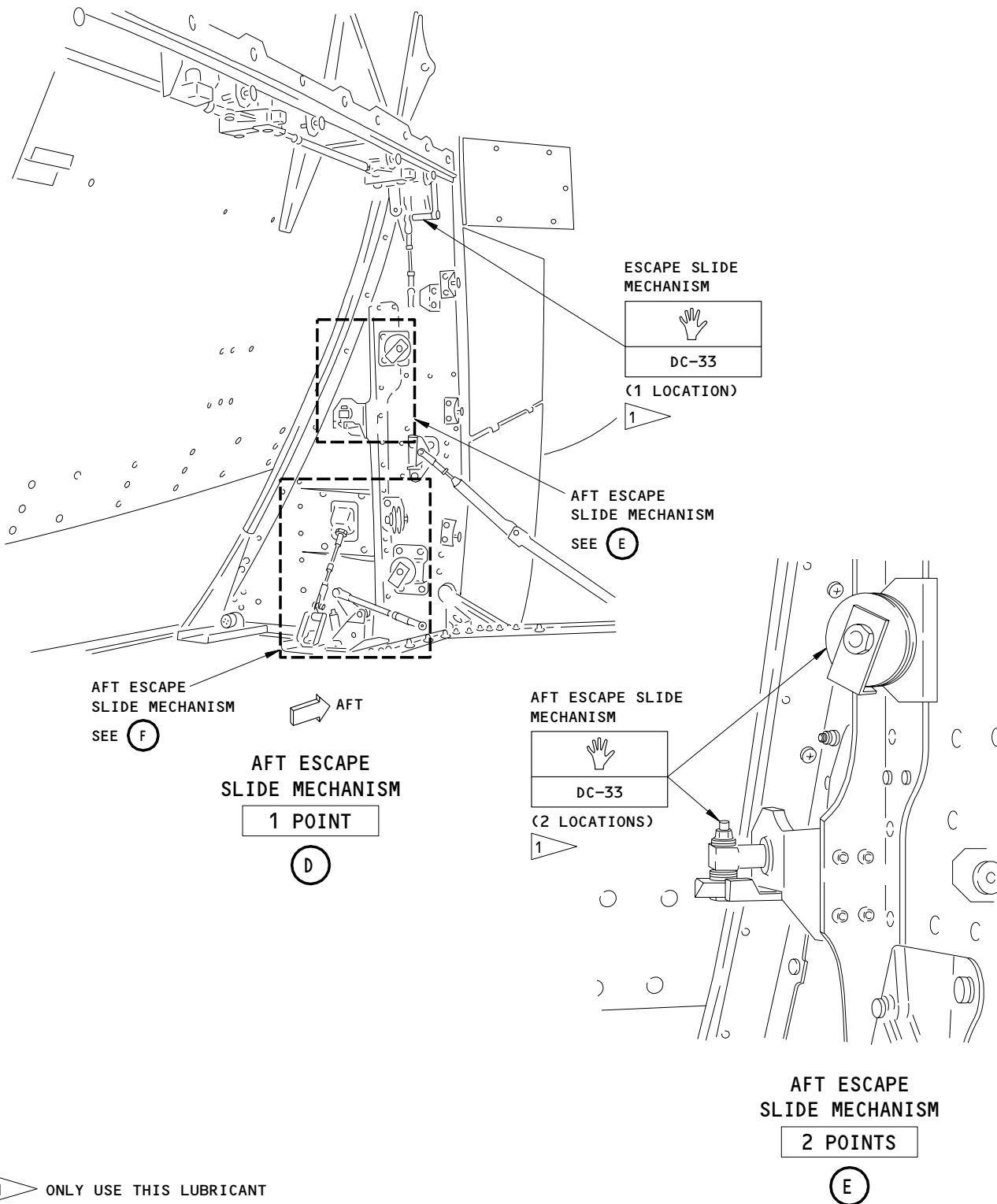
Off-Wing Escape System Lubrication
Figure 301 (Sheet 2)

EFFECTIVITY	ALL
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12-21-19

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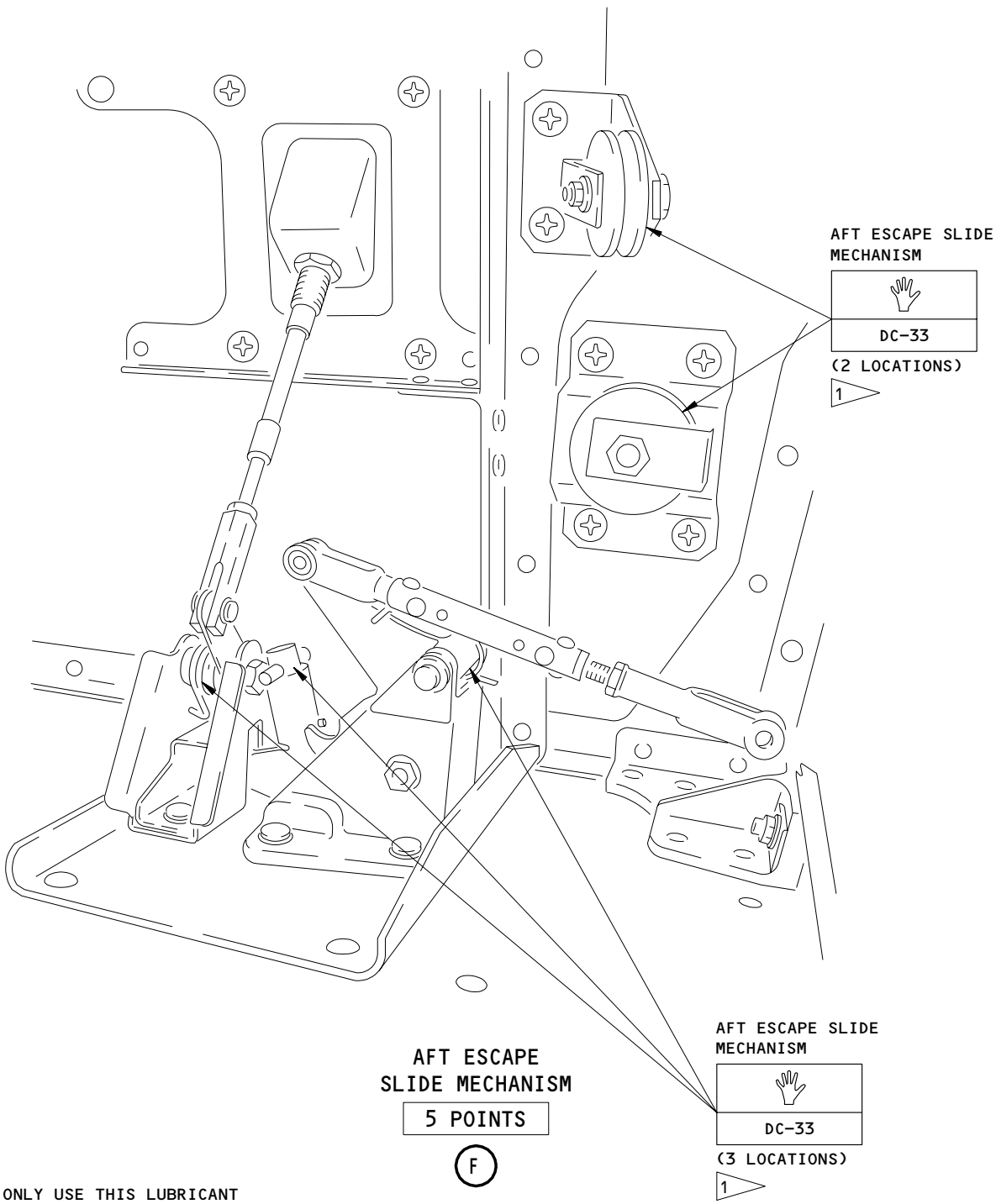
Page 304
Apr 22/04



Off-Wing Escape System Lubrication
Figure 301 (Sheet 3)

EFFECTIVITY	
	ALL

12-21-19



Off-Wing Escape System Lubrication
Figure 301 (Sheet 4)

EFFECTIVITY	ALL
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12-21-19

01

Page 306
Aug 22/03

612977

OVERWING ESCAPE HATCH – SERVICING (LUBRICATION)

1. General

- A. This procedure contains one task. The task is to lubricate the overwing escape hatch mechanism.

TASK 12-21-20-643-001

2. Lubricate the Overwing Escape Hatch Mechanism

A. Consumable Materials

- (1) D00633 Grease – BMS 3-33 (Preferred)
- (2) D00013 Grease – MIL-PRF-23827 (Alternate)
- (3) D00014 Grease – MIL-G-21164

B. References

- (1) AMM 52-21-01/201, Overwing Escape Hatch
- (2) AMM 52-21-02/201, Overwing Escape Hatch Lining.

C. Access

- (1) Location Zones
 - 832/842 Overwing Escape Hatch (Left/Right)
 - 834/844 Overwing Escape Hatch (Left/Right)

D. Procedure

S 023-002

WARNING: YOU MUST OBEY THE PROCEDURE TO REMOVE THE OVERWING ESCAPE HATCH. IF YOU INCORRECTLY REMOVE THE OVERWING ESCAPE HATCH, THE ESCAPE SLIDE CAN ACCIDENTALLY INFLATE AND CAUSE INJURY OR DAMAGE.

- (1) Remove the overwing escape hatch (AMM 52-21-01/201).

S 033-003

- (2) Remove the overwing escape hatch lining (AMM 52-21-02/201).

S 643-005

- (3) Lubricate the bellcrank rollers and the needle bearings (Fig. 301).

S 643-004

- (4) Lubricate the stop pins and the bearing plates (Fig. 301).

S 433-006

- (5) Install the overwing escape hatch lining (AMM 52-21-02/201).

S 423-007

WARNING: YOU MUST OBEY THE PROCEDURE TO INSTALL THE OVERWING ESCAPE HATCH. IF YOU INCORRECTLY INSTALL THE OVERWING ESCAPE HATCH, THE ESCAPE SLIDE CAN ACCIDENTALLY INFLATE AND CAUSE INJURY OR DAMAGE.

- (6) Install the overwing escape hatch (AMM 52-21-01/201).

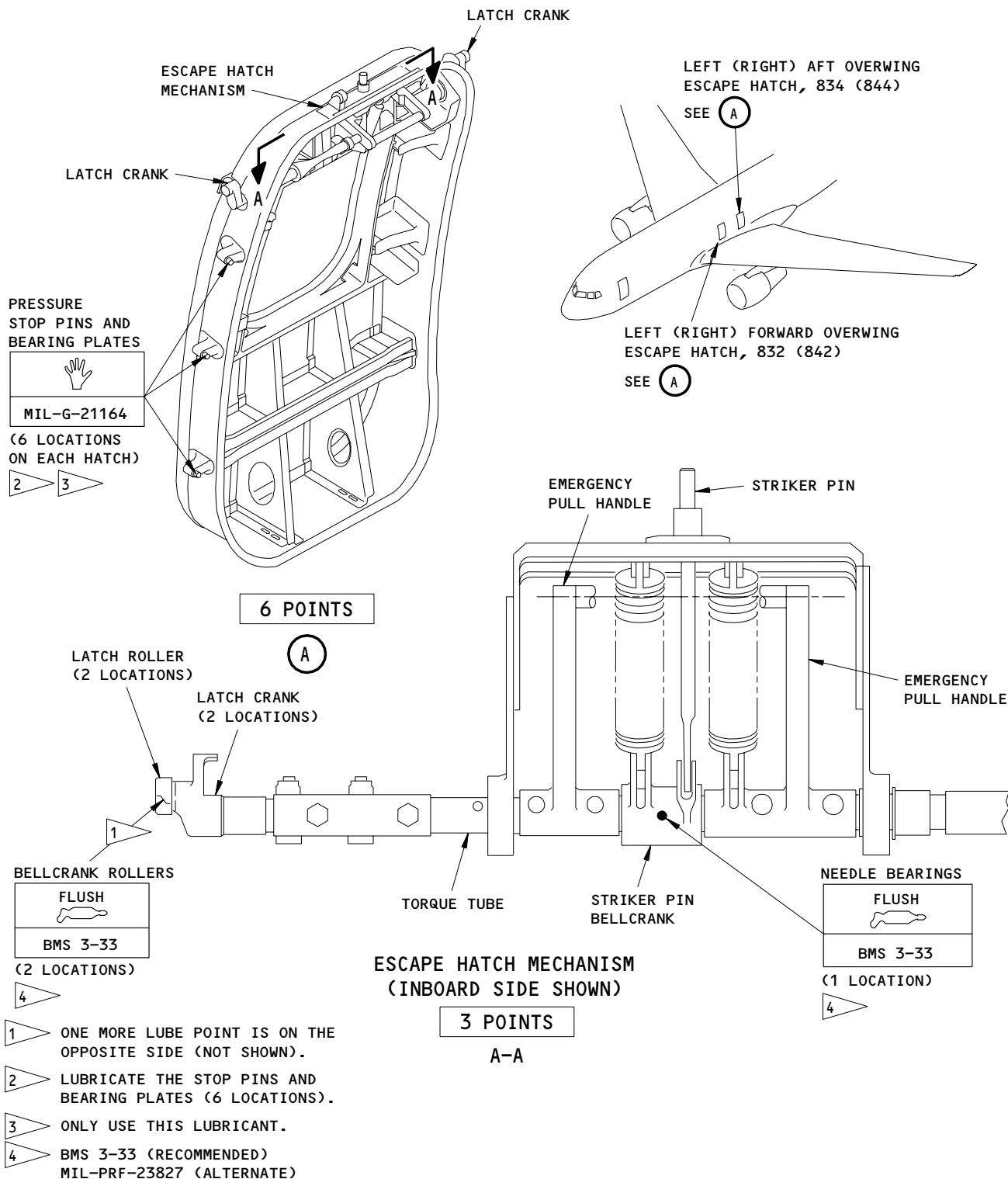
EFFECTIVITY

ALL

12-21-20

02

Page 301
Apr 22/08



Overwing Escape Hatch Lubrication
Figure 301

EFFECTIVITY	
	ALL

12-21-20

FORWARD AND AFT CARGO DOOR – SERVICING (LUBRICATION)

1. General

A. This procedure contains one task. The task is to lubricate the forward and aft cargo doors.

TASK 12-21-22-603-001

2. Lubricate the Forward and Aft Cargo Doors

A. Consumable Materials

- (1) D00633 Grease – BMS 3-33 (Preferred)
- (2) D00013 Grease – MIL-PRF-23827 (Alternate)
- (3) D00014 Grease – MIL-G-21164
- (4) D00133 Grease – MIL-L-6085

B. Access

(1) Location Zones

- 821 Forward Cargo Door
- 822 Aft Cargo Door

C. Procedure – Lubricate the Forward and Aft Cargo Doors

S 643-003

- (1) Lubricate the large forward cargo door (Fig. 301). Lubricate the standard aft cargo door (Fig. 302).

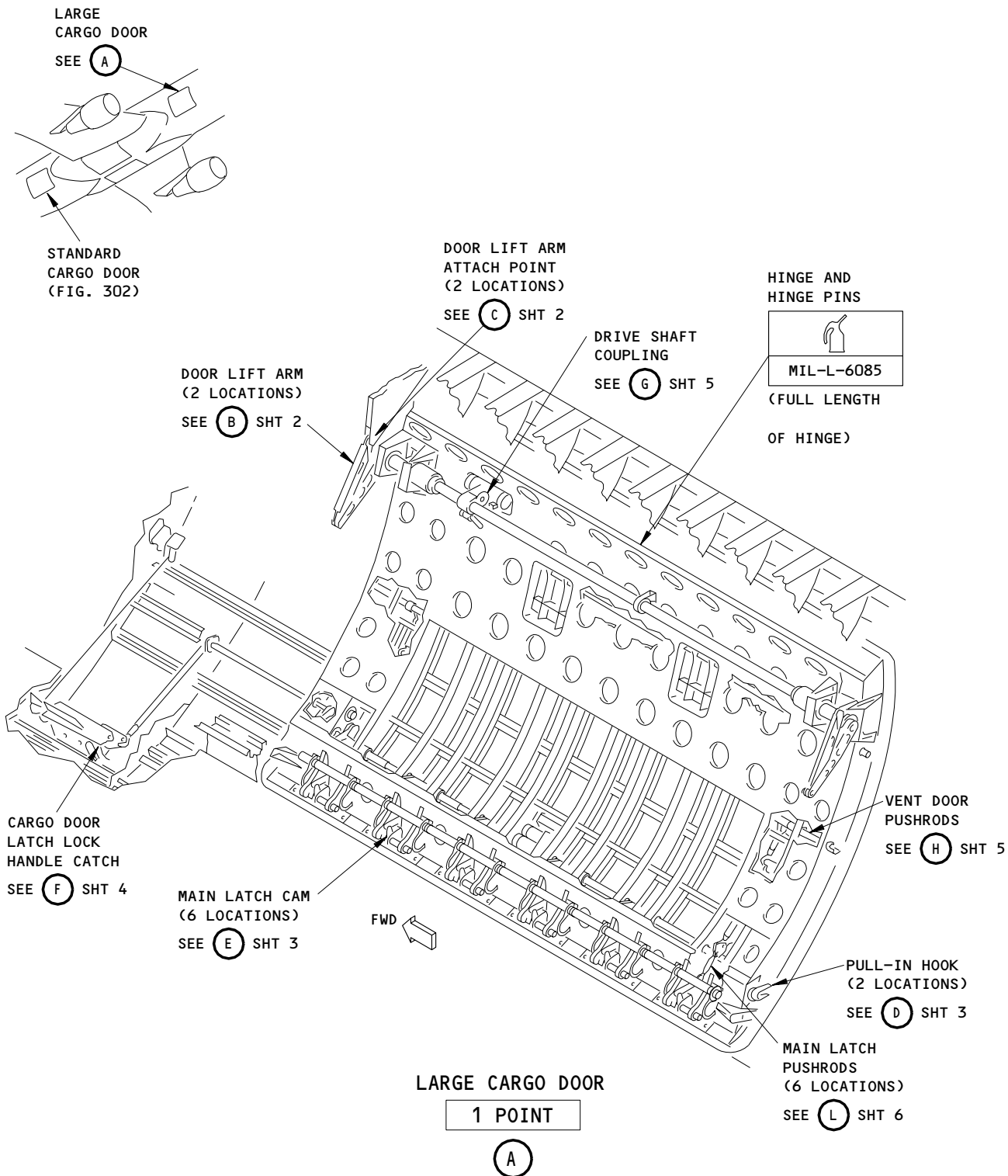
EFFECTIVITY

ALL

12-21-22

06

Page 301
Apr 22/04



Large Cargo Door Lubrication
Figure 301 (Sheet 1)

EFFECTIVITY

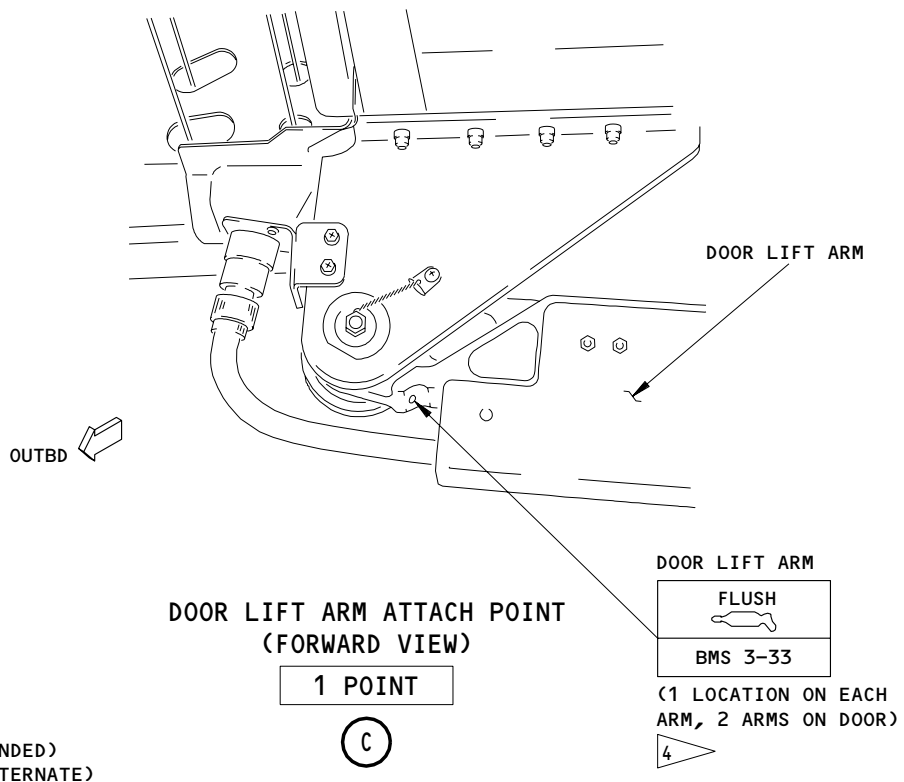
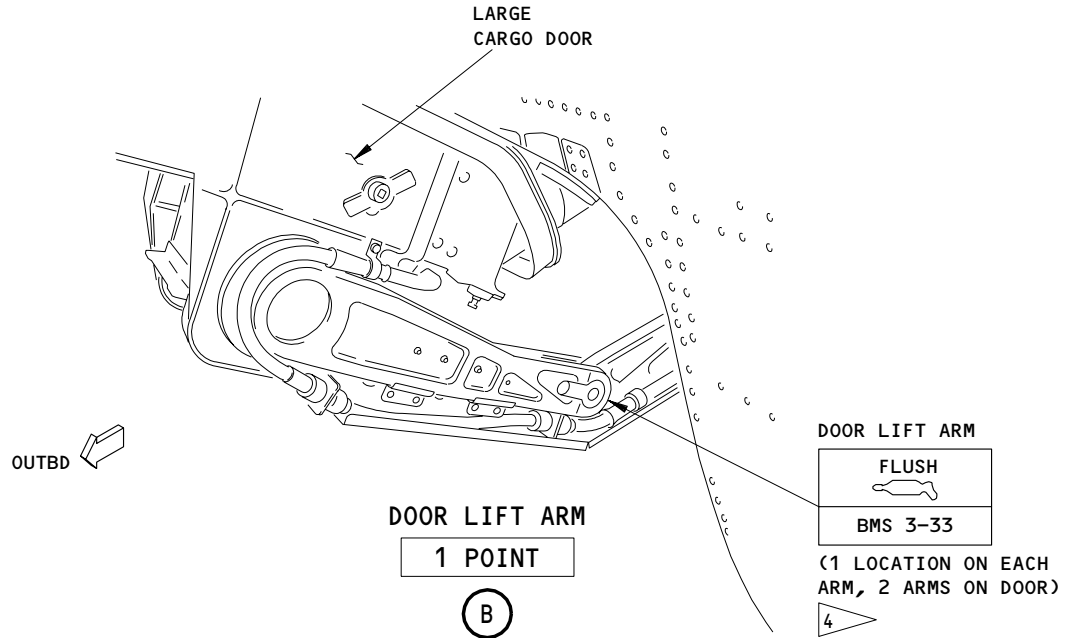
ALL

12-21-22

03

Page 302
Dec 22/01

BOEING
767
MAINTENANCE MANUAL



4 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Large Cargo Door Lubrication
Figure 301 (Sheet 2)

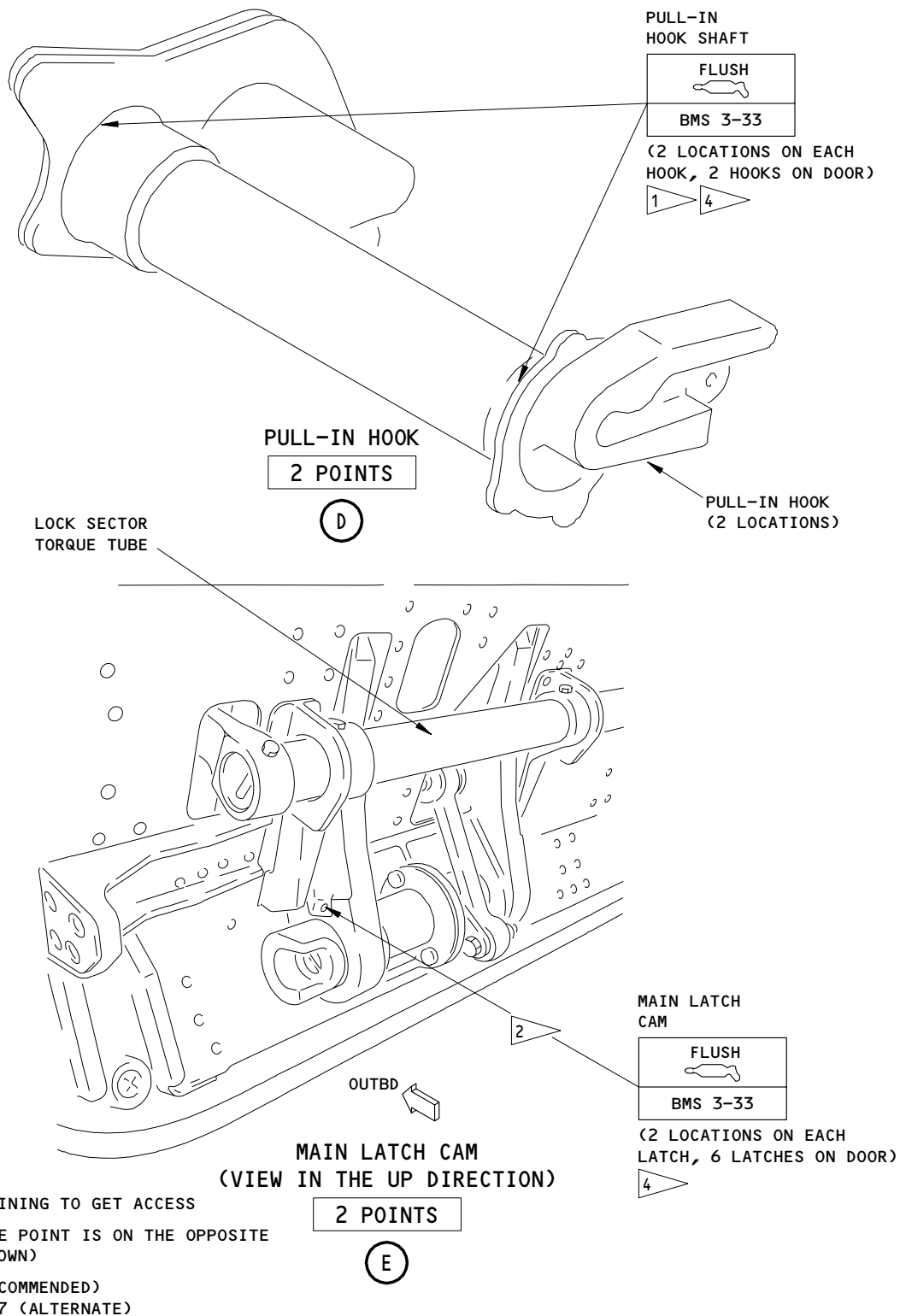
EFFECTIVITY	
	ALL

12-21-22

02

Page 303
Aug 22/03

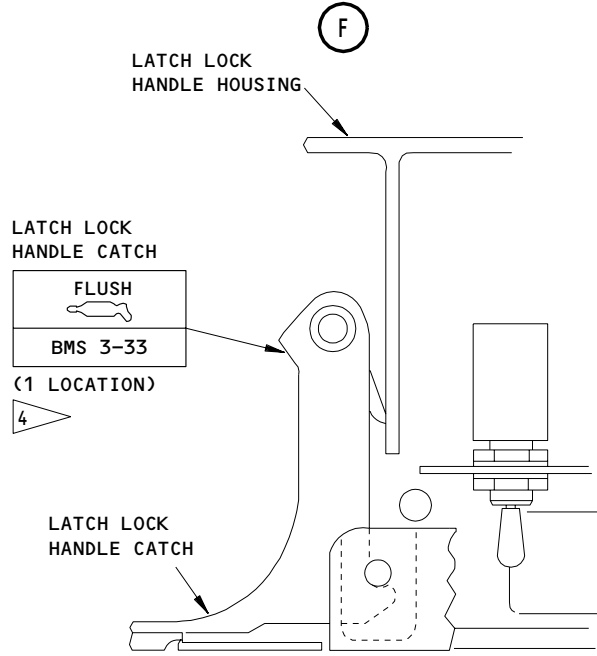
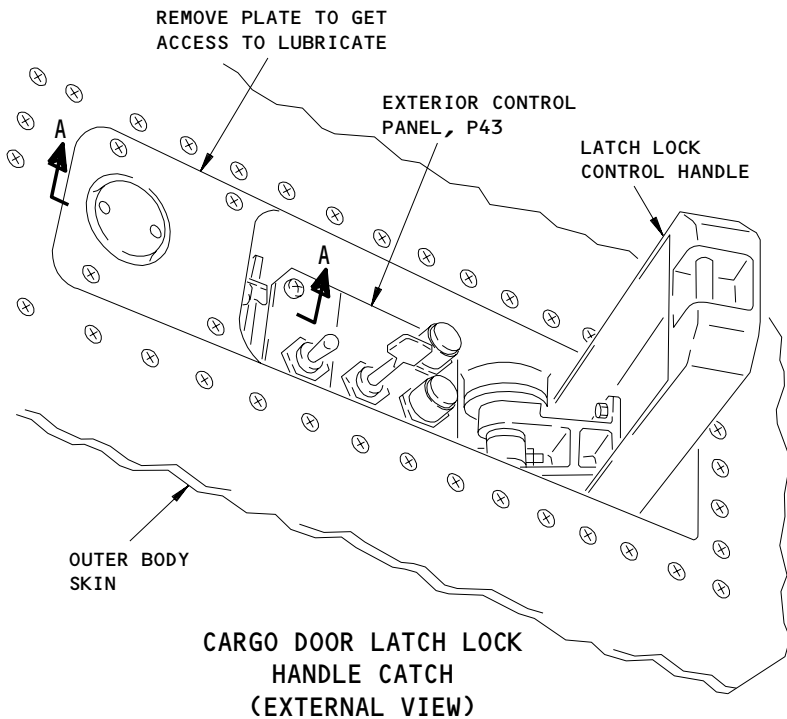
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Large Cargo Door Lubrication
Figure 301 (Sheet 3)

EFFECTIVITY	
	ALL

12-21-22



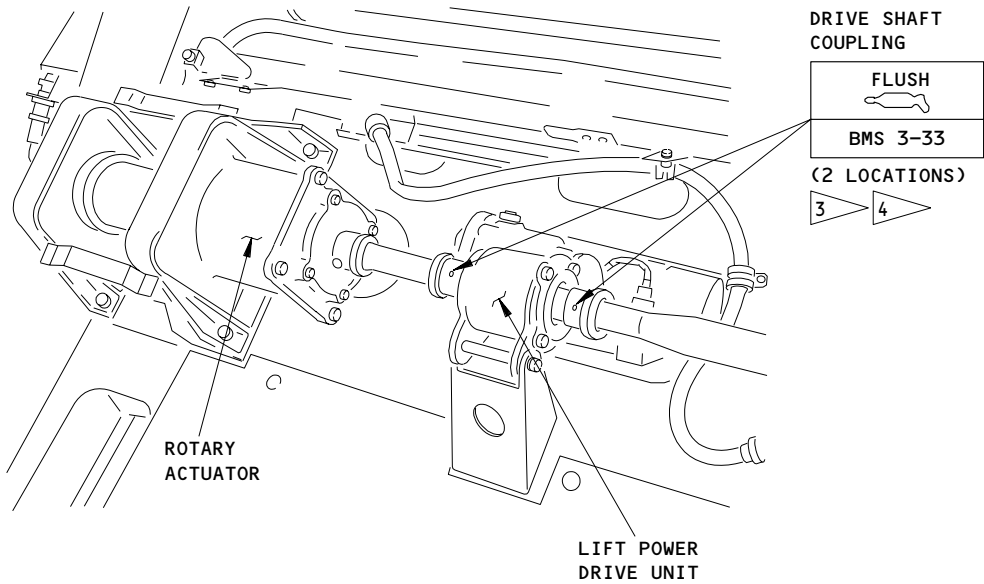
4 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Large Cargo Door Lubrication
Figure 301 (Sheet 4)

EFFECTIVITY	ALL
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12-21-22

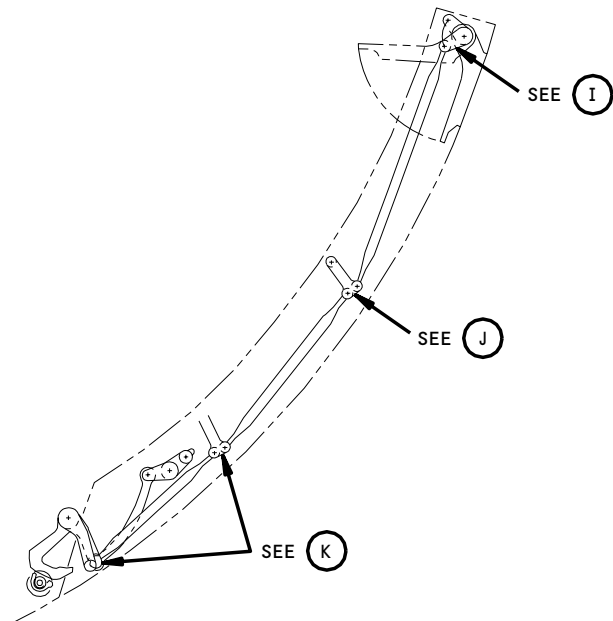
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**DRIVE SHAFT COUPLING
(VIEW IN THE UP DIRECTION)**

2 POINTS

(G)



VENT DOOR PUSHRODS

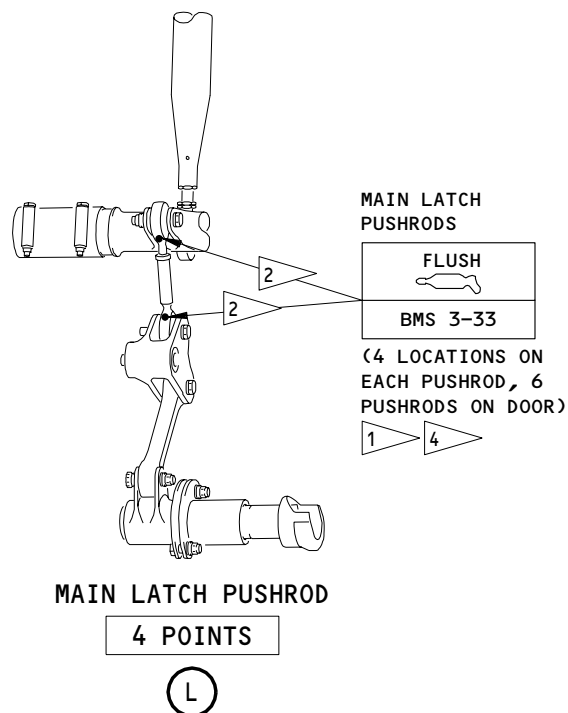
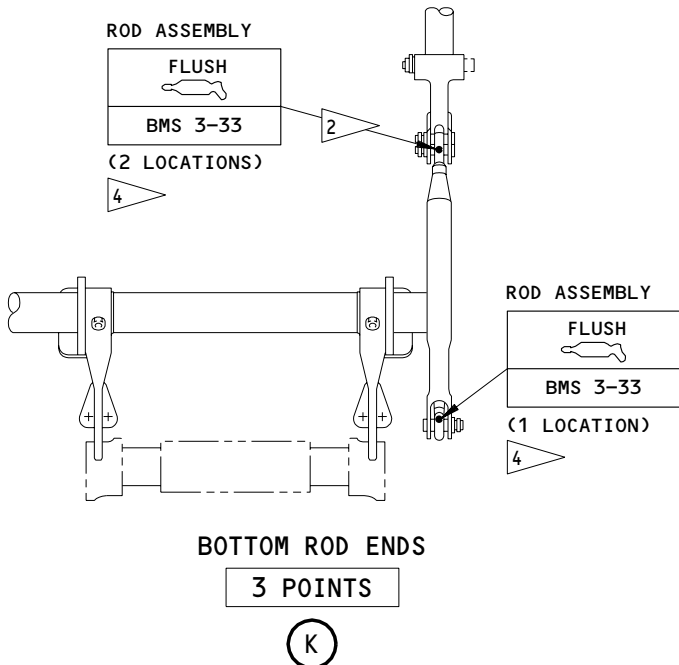
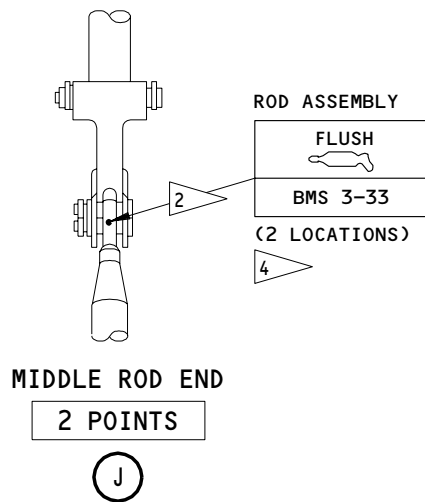
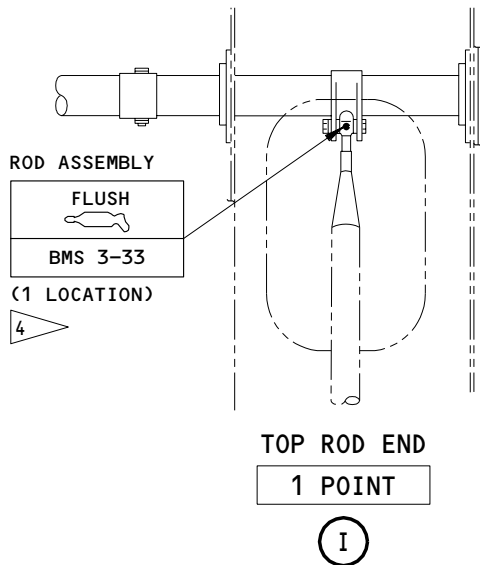
(H)

- 3** 2 LUBRICATION HOLES ON EACH COUPLING, LUBE ONLY ONE
- 4** BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

**Large Cargo Door Lubrication
Figure 301 (Sheet 5)**

EFFECTIVITY	
	ALL

12-21-22



- 1 REMOVE THE LINING TO GET ACCESS
- 2 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN)
- 4 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Large Cargo Door Lubrication
Figure 301 (Sheet 6)

EFFECTIVITY

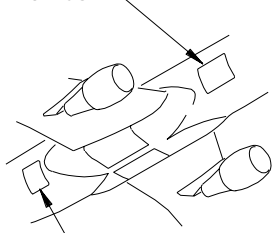
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12-21-22

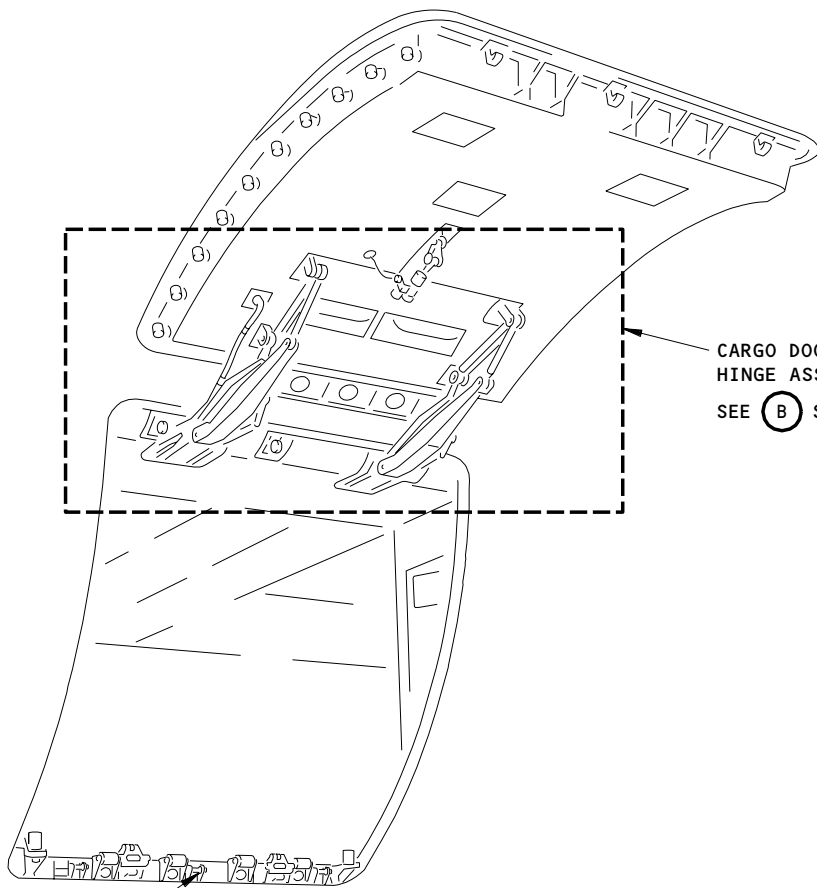
02

Page 307
Aug 22/03

LARGE
CARGO DOOR
(FIG. 301)



STANDARD
CARGO DOOR
SEE (A)



CARGO DOOR
HINGE ASSEMBLY
SEE (B) SHT 2

HOOK ROLLER
ATTACH BOLT
SEE (K) SHT 8

STANDARD CARGO DOOR
(DOOR IS IN THE OPEN POSITION)

(A)

Standard Cargo Door Lubrication
Figure 302 (Sheet 1)

EFFECTIVITY

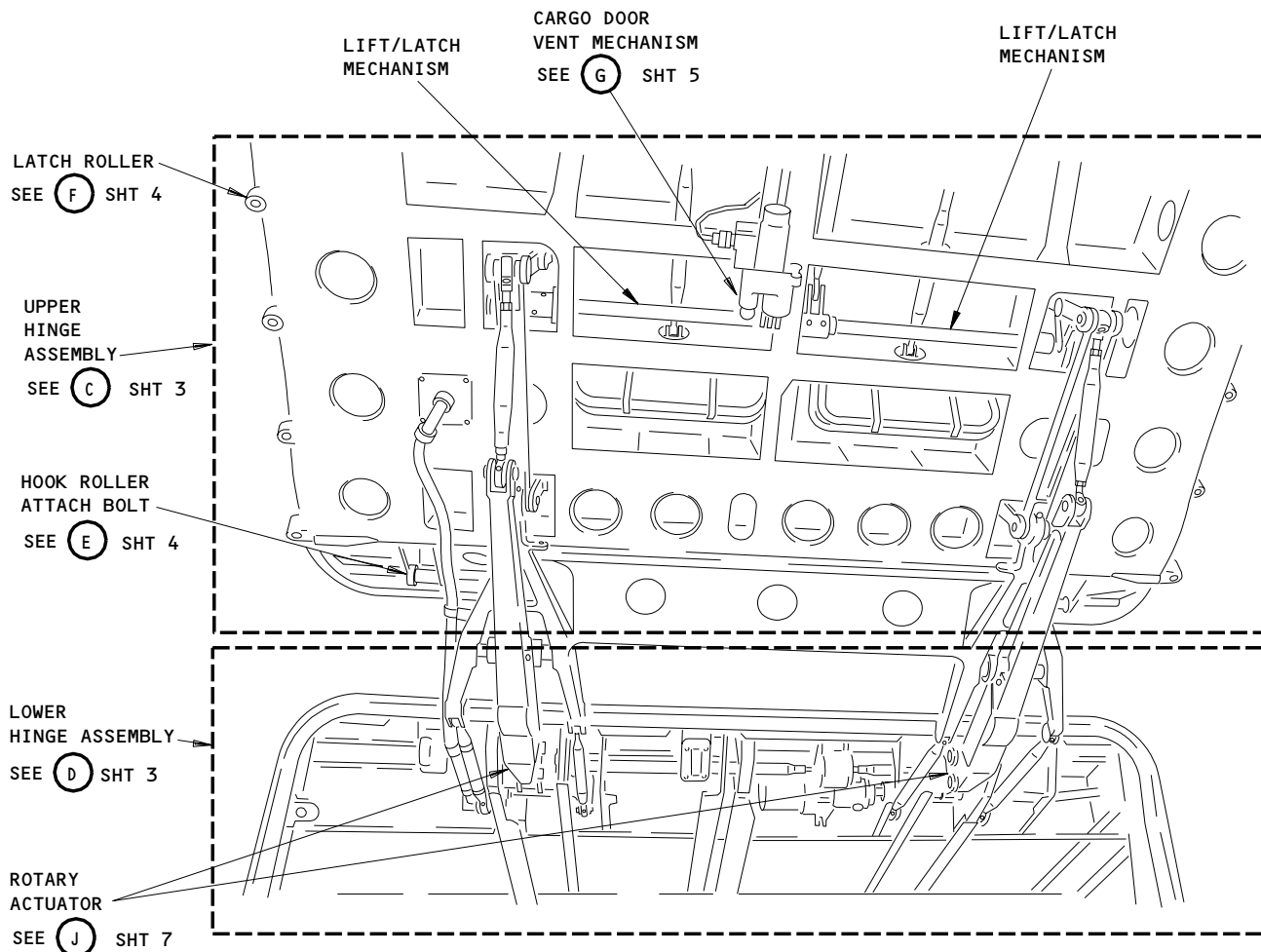
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12-21-22

04

Page 308
Aug 22/01

50397



CARGO DOOR HINGE ASSEMBLY

(B)

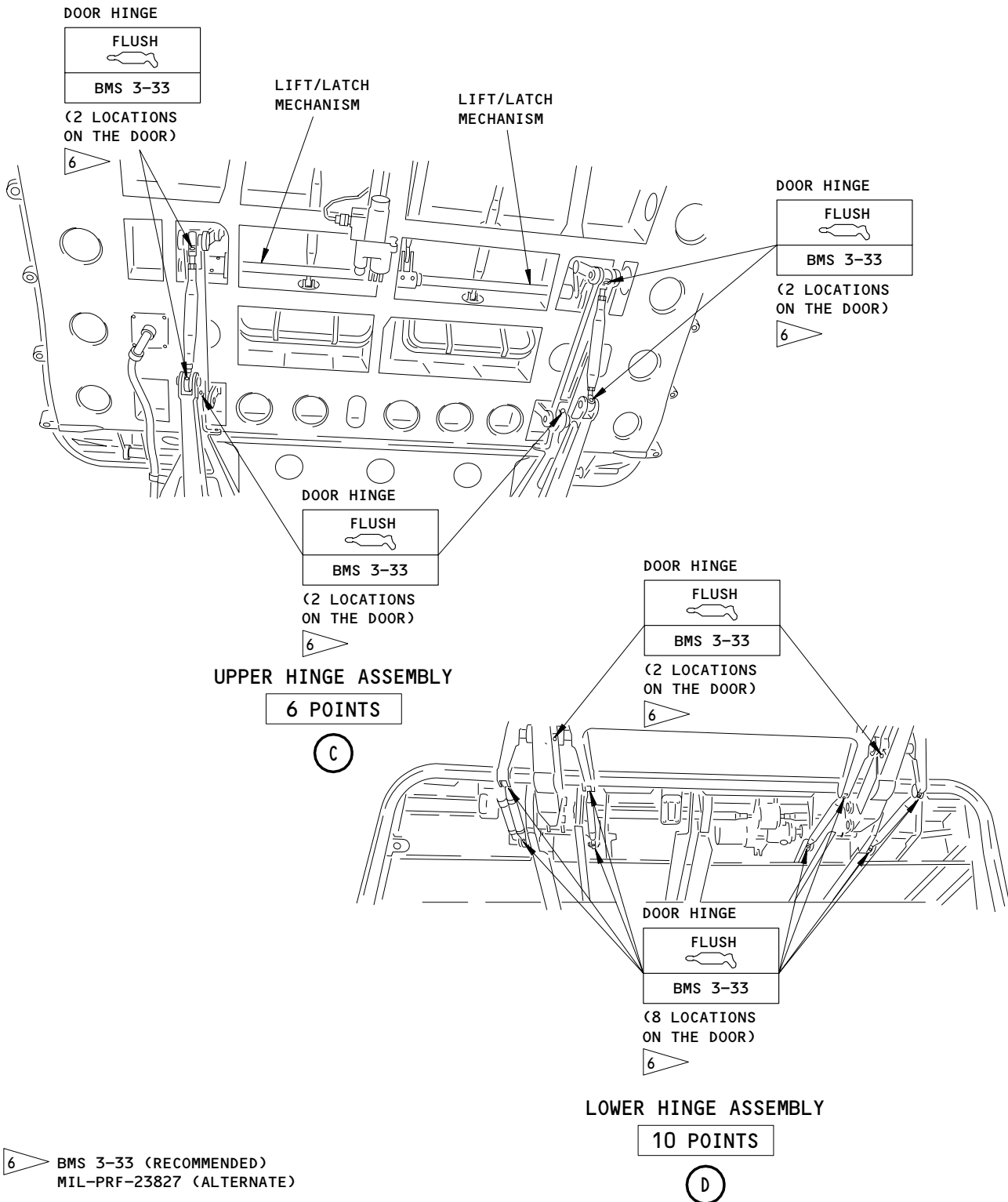
Standard Cargo Door Lubrication
Figure 302 (Sheet 2)

EFFECTIVITY	
	ALL

12-21-22

BOEING

767 MAINTENANCE MANUAL



Standard Cargo Door Lubrication
Figure 302 (Sheet 3)

EFFECTIVITY	
	ALL

12-21-22

HOOK ROLLER
ATTACH BOLT



(1 LOCATION ON EACH
HOOK, 3 HOOKS ON DOOR)

7

STANDARD
CARGO
DOOR

HOOK ROLLER ATTACH BOLT
(VIEW IN THE UP DIRECTION)

1 POINT

STOP FITTING
(EXAMPLE, 20 LOCATIONS)

SEE (I) SHT 7

(E)

LATCH ROLLER

FLUSH

BMS 3-33

(2 LOCATIONS
ON THE DOOR)

6

OUTBD

LATCH ROLLER
(SIDE VIEW)

2 POINTS

LIFT/LATCH
MECHANISM

(F)

1 ONE MORE LUBE POINT IS ON THE
OPPOSITE SIDE (NOT SHOWN)

6 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

7 ONLY USE THIS LUBRICANT

Standard Cargo Door Lubrication
Figure 302 (Sheet 4)

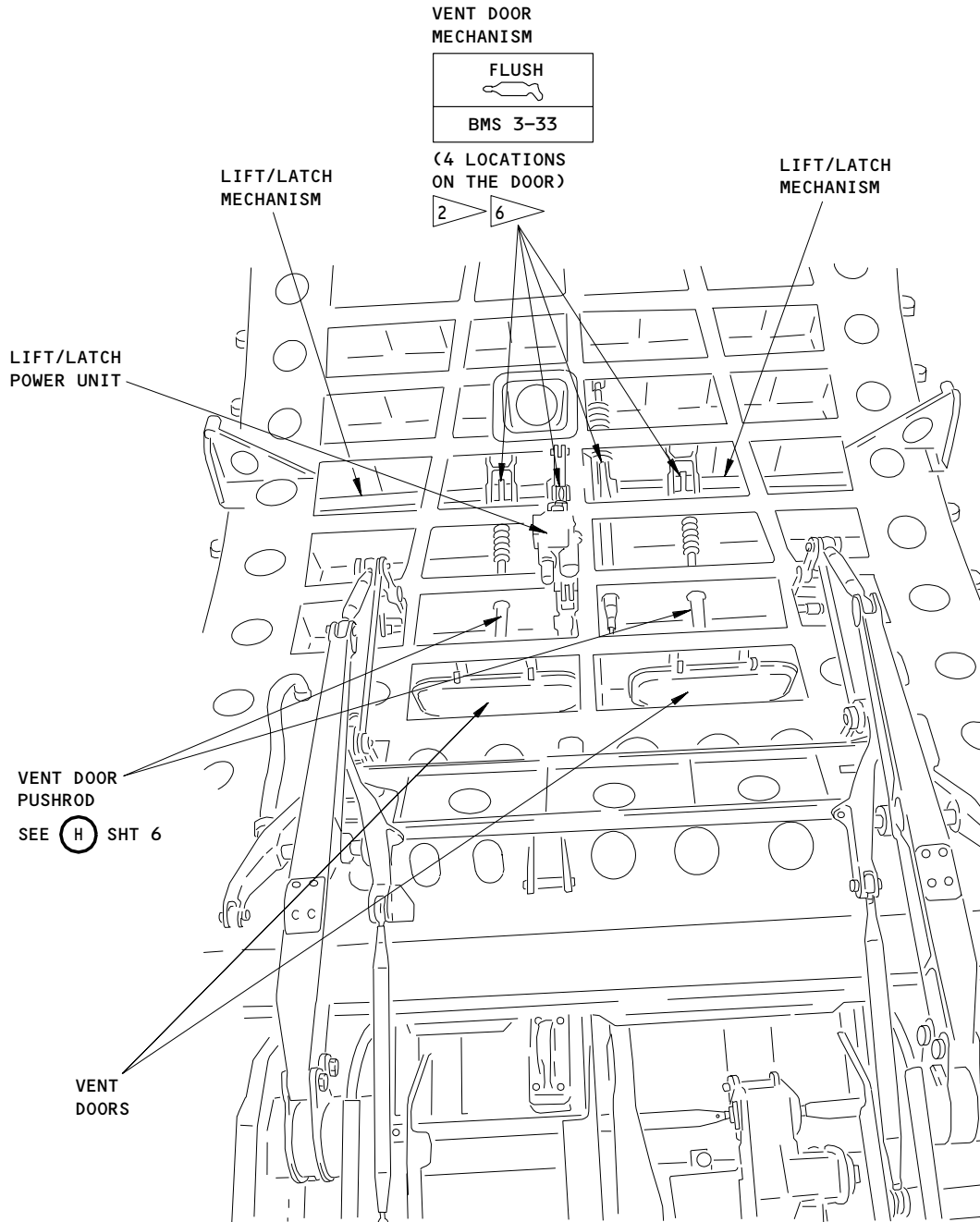
EFFECTIVITY

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

12-21-22

01

Page 311
Aug 22/05



CARGO DOOR VENT MECHANISM (VIEW IN THE UP DIRECTION)

-  REMOVE THE LINING TO GET ACCESS
-  BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

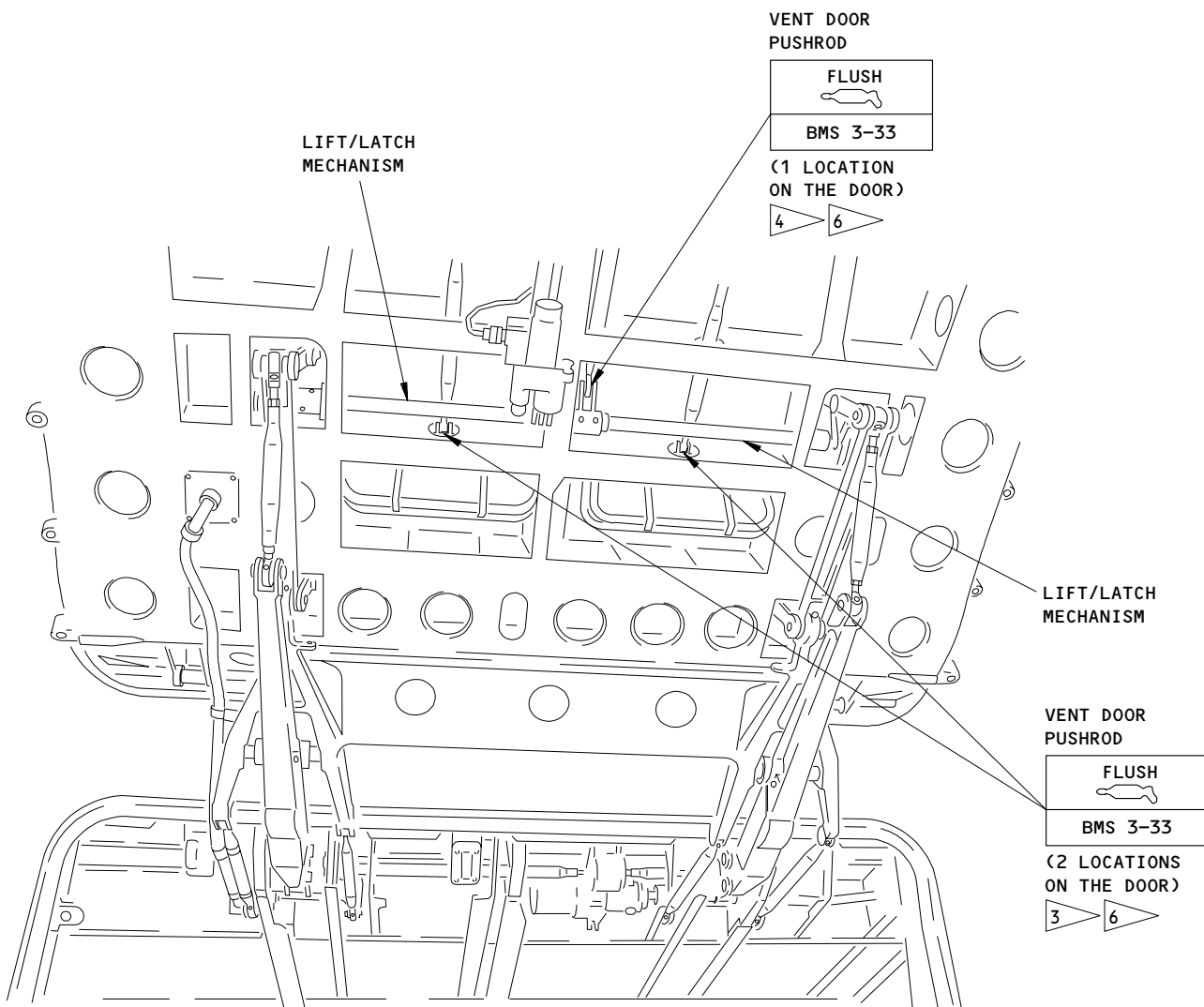
4 POINTS

(G)

Standard Cargo Door Lubrication
Figure 302 (Sheet 5)

EFFECTIVITY	
	ALL

12-21-22



VENT DOOR PUSHROD
(VIEW IN THE UP DIRECTION)

3 POINTS

(H)

- 3 CLOSE THE DOOR TO GET ACCESS
- 4 PULL BACK THE VELCRO LINING TO GET ACCESS
- 6 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Standard Cargo Door Lubrication
Figure 302 (Sheet 6)

EFFECTIVITY	
	ALL

12-21-22

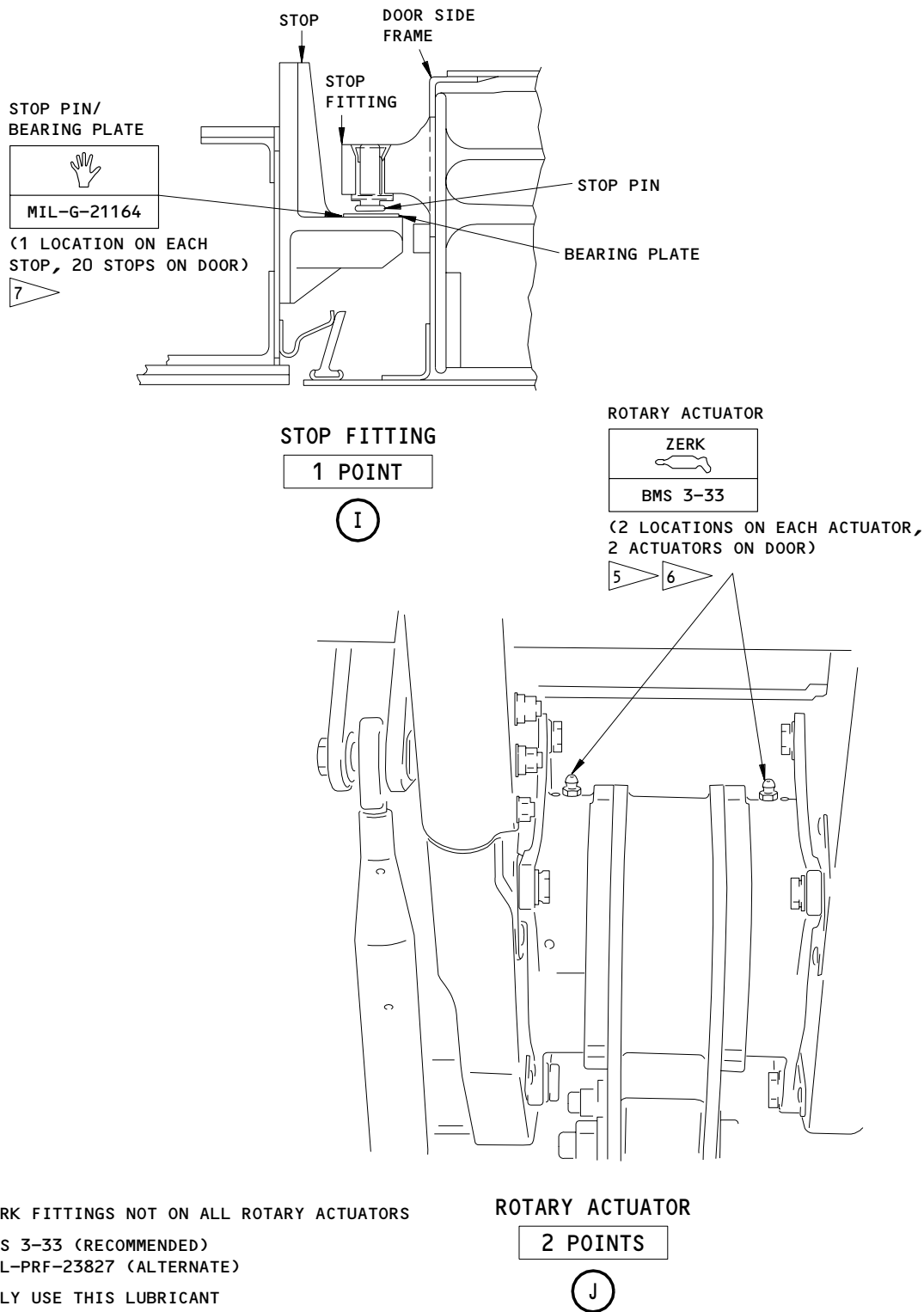
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Page 313
Aug 22/03

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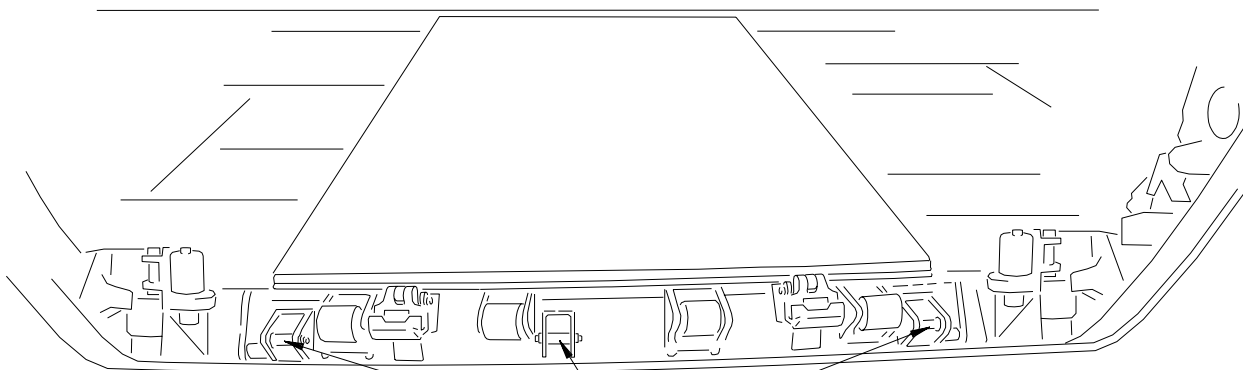
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Standard Cargo Door Lubrication
Figure 302 (Sheet 7)

EFFECTIVITY	
	ALL

12-21-22



HOOK ROLLER
ATTACH BOLT



(1 LOCATION ON EACH
HOOK, 3 HOOKS ON DOOR)



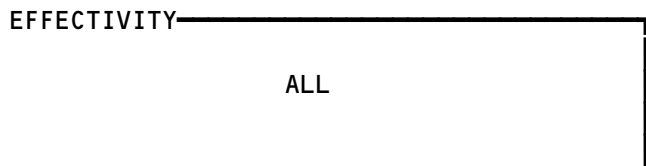
HOOK ROLLER ATTACH BOLT

3 POINTS



 ONLY USE THIS LUBRICANT

Standard Cargo Door Lubrication
Figure 302 (Sheet 8)



12-21-22

01

Page 315
Aug 22/03

BULK CARGO DOOR - SERVICING (LUBRICATION)

1. General

- A. This procedure contains these tasks:
 - (1) The task to lubricate the stop pins, and stop pads on the bulk cargo door and the fuselage structure.
 - (2) The task to lubricate the cables for the bulk cargo door.
- B. Regular lubrication is only necessary for the door stop pins, stop pads and cables. All other parts are permanently lubricated with teflon. If you lubricate the parts lubricated with teflon, deterioration of the performance of the parts can occur.

TASK 12-21-24-643-006

2. Lubricate the Bulk Cargo Door Stop Pins and Stop Pads (Fig. 301)

- A. Consumable Materials
 - (1) D00633 Grease - BMS 3-33 (Preferred)
 - (2) D00014 Grease - MIL-G-21164 (Alternate)
- B. Access
 - (1) Location Zone
811 Bulk Cargo Door
- C. Procedure - Lubricate the Bulk Cargo Door Stop Pins and Stop Pads
 - S 013-007
 - (1) Open the bulk cargo door sufficiently to get access to the stop pins and stop pads.
 - S 643-003
 - (2) Apply a light layer of the grease to the stop pins and the stop pads.

TASK 12-21-24-643-009

3. Lubricate the Bulk Cargo Door Cables (Fig. 302)

- A. Consumable Materials
 - (1) D00633 Grease - BMS 3-33 (Preferred)
 - (2) D00015 Grease - BMS 3-24 (Alternate)
- B. Access
 - (1) Location Zone
811 Bulk Cargo Door

EFFECTIVITY

ALL

12-21-24

05

Page 301
Dec 22/07

C. Procedure - Lubricate the Bulk Cargo Door Cables

S 013-010

- (1) Open the bulk cargo door sufficiently to get access to the cargo compartment.

S 863-011

- (2) Go inside the cargo compartment and close the bulk cargo door to get access to the cables.

S 163-012

CAUTION: DO NOT CLEAN THE CABLES WITH A SOLVENT. THE SOLVENT WILL MAKE THE GREASE THAT YOU WILL APPLY TOO THIN.

- (3) Use a dry cloth to remove the used lubricant and all unwanted material from the surface of the cables.

S 643-013

- (4) Use an applicator or a brush to make a light layer of lubricant along the full length of the cables.

NOTE: Make sure you can see a thin strip of grease in the bottom of the grooves in the cables. The grooves must be full of grease in the areas where friction occurs.

S 643-014

- (5) Go outside the cargo compartment and cycle the bulk cargo door to spread the grease.

S 413-015

- (6) Close the bulk cargo door.

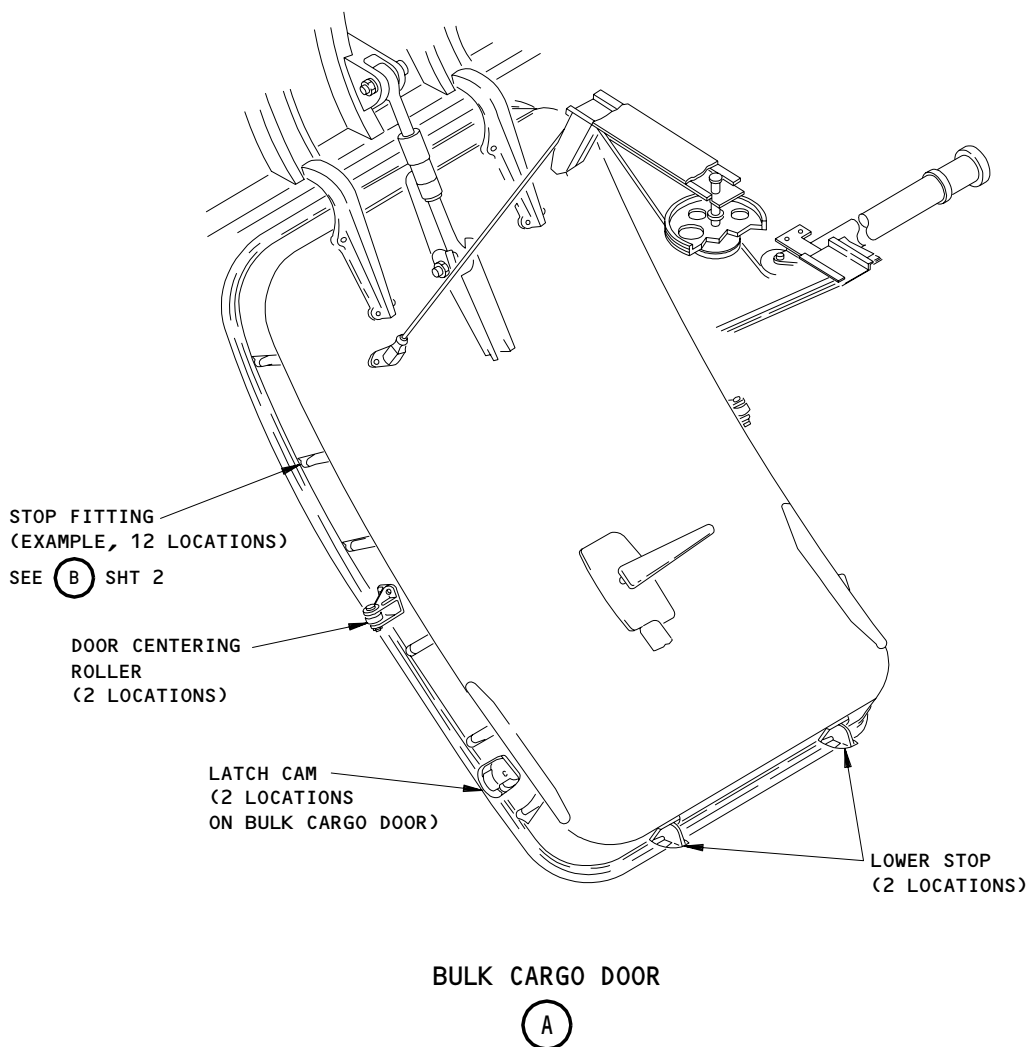
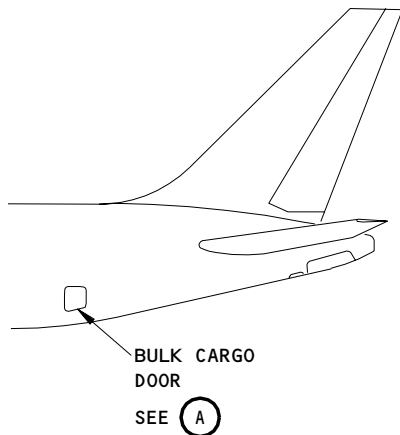
EFFECTIVITY

ALL

12-21-24

02

Page 302
Apr 22/00



Bulk Cargo Door Lubrication
Figure 301 (Sheet 1)

EFFECTIVITY	
	ALL

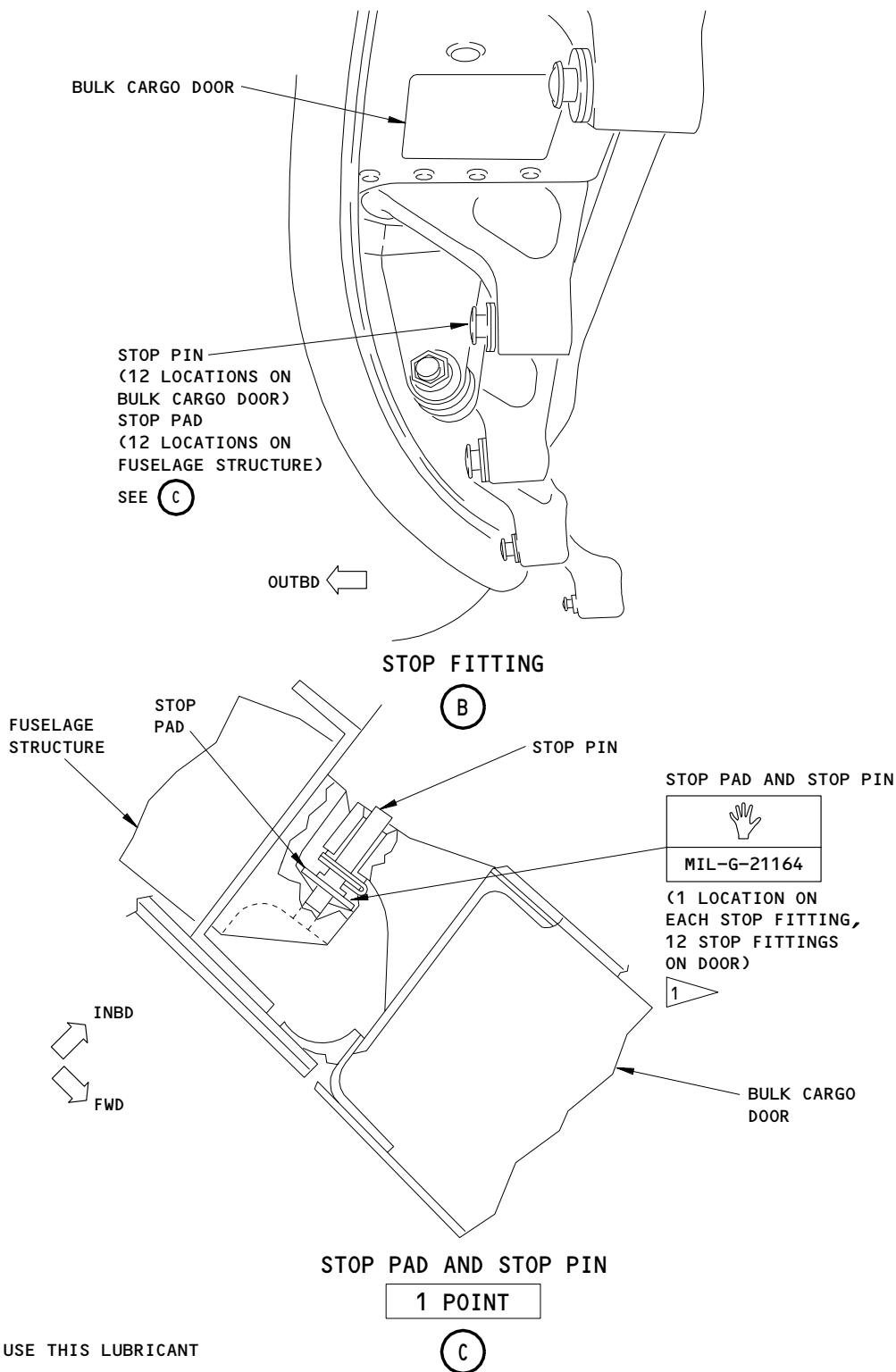
12-21-24

02

Page 303
Aug 22/01

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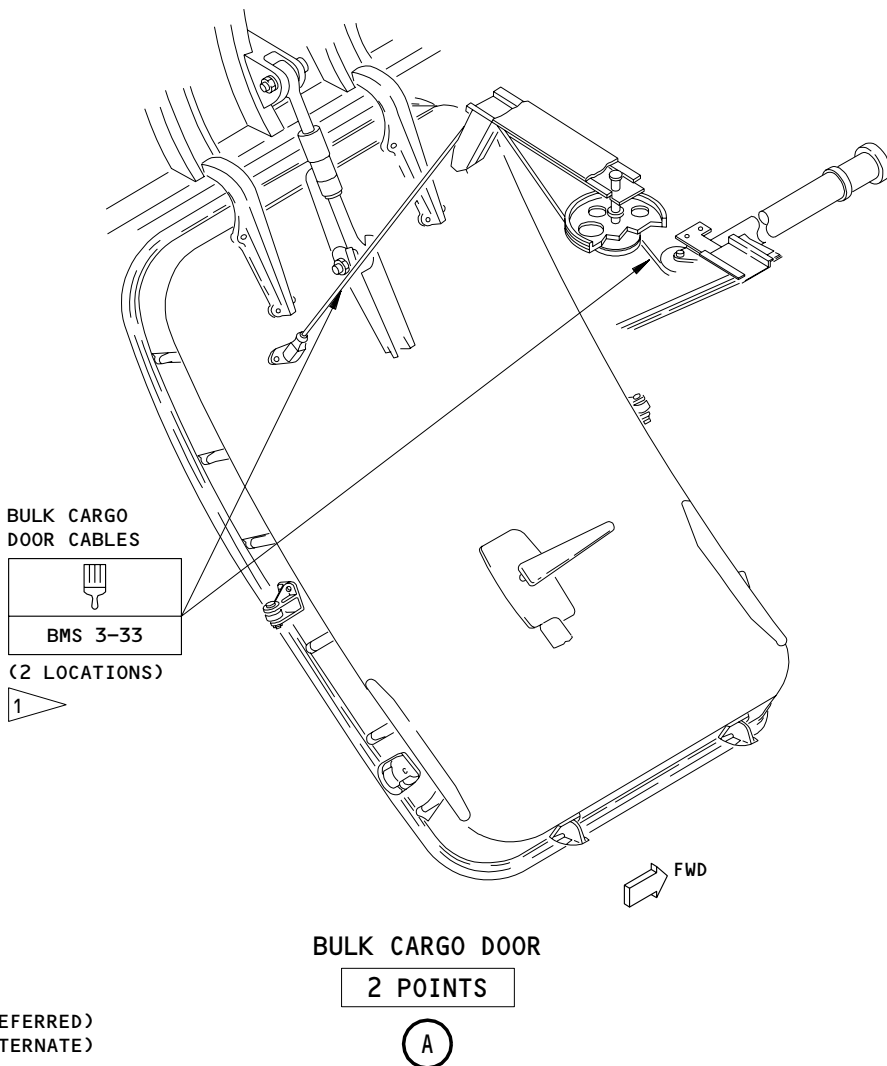
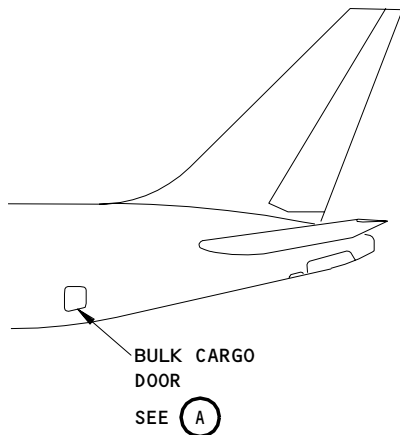
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MAINTENANCE MANUAL



Bulk Cargo Door Lubrication
Figure 301 (Sheet 2)

EFFECTIVITY	ALL
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12-21-24



1 BMS 3-33 (PREFERRED)
BMS 3-24 (ALTERNATE)

Bulk Cargo Door Cable Lubrication
Figure 302

EFFECTIVITY	ALL
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12-21-24

03

Page 305
Apr 22/08

THRUST LEVERS – SERVICING

1. General

- A. As an optional method, it is permitted to remove the thrust levers from the control stand to lubricate the reverse thrust lever latch (AMM 76-11-01/401).

TASK 12-21-25-643-014

2. Lubricate the Reverse Thrust Levers

A. Consumable Materials

- (1) D00010 Compound – Antiseize, High Temperature, MIL-PRF-907 (AMM 20-30-04/201)
(2) G01163 Cloth – Clean Absorbent, 1x2 foot (AMM 20-30-07/201)

B. References

- (1) AMM 76-11-01/401, Thrust Levers
(2) AMM 78-31-00/201, Thrust Reverser System

C. Access

- (1) Location Zones
210 Control Cabin

D. Lubricate the Reverse Thrust Lever Latch (Fig. 301)

S 043-013

WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO YOU AND DAMAGE TO EQUIPMENT.

- (1) Do the Thrust Reverser Deactivation Procedure for ground maintenance (AMM 78-31-00/201).

S 863-012

- (2) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
(a) 11G11, AUTO SPEEDBRAKE

S 013-011

- (3) Remove the center cover, the center cover seal, and the rail from the control stand.

S 493-010

- (4) Put the absorbant cloth below the latch of the reverse thrust lever to catch any leakage from the lubricant.

EFFECTIVITY
AIRPLANES WITH TITANIUM THRUST LEVER
ASSEMBLY P/N 254N1131

12-21-25

S 643-015

CAUTION: USE ONLY MIL-A-907 ANTI-SEIZE COMPOUNDS. USE OF OTHER LUBRICANTS CAN RESULT IN TOO MUCH LOAD ON THE REVERSE THRUST LEVER .

- (5) Use a clean applicator to apply anti-seize compound to the surfaces where the latch and notch engage.
(a) Move the reverse thrust levers to make sure the surfaces are lubricated.

S 213-007

- (6) Do a visual check to make sure the surfaces are coated with the compound.

S 753-006

- (7) Move the reverse thrust lever forward and back and listen for a metallic scraping sound as the latch moves out of the notch.
(a) If no sound is heard, the latch is correctly lubricated.

S 643-005

- (8) Do the procedure again for the other latch.

S 093-004

- (9) Remove the cloth. Put the reverse thrust lever back to the forward idle position.

S 413-003

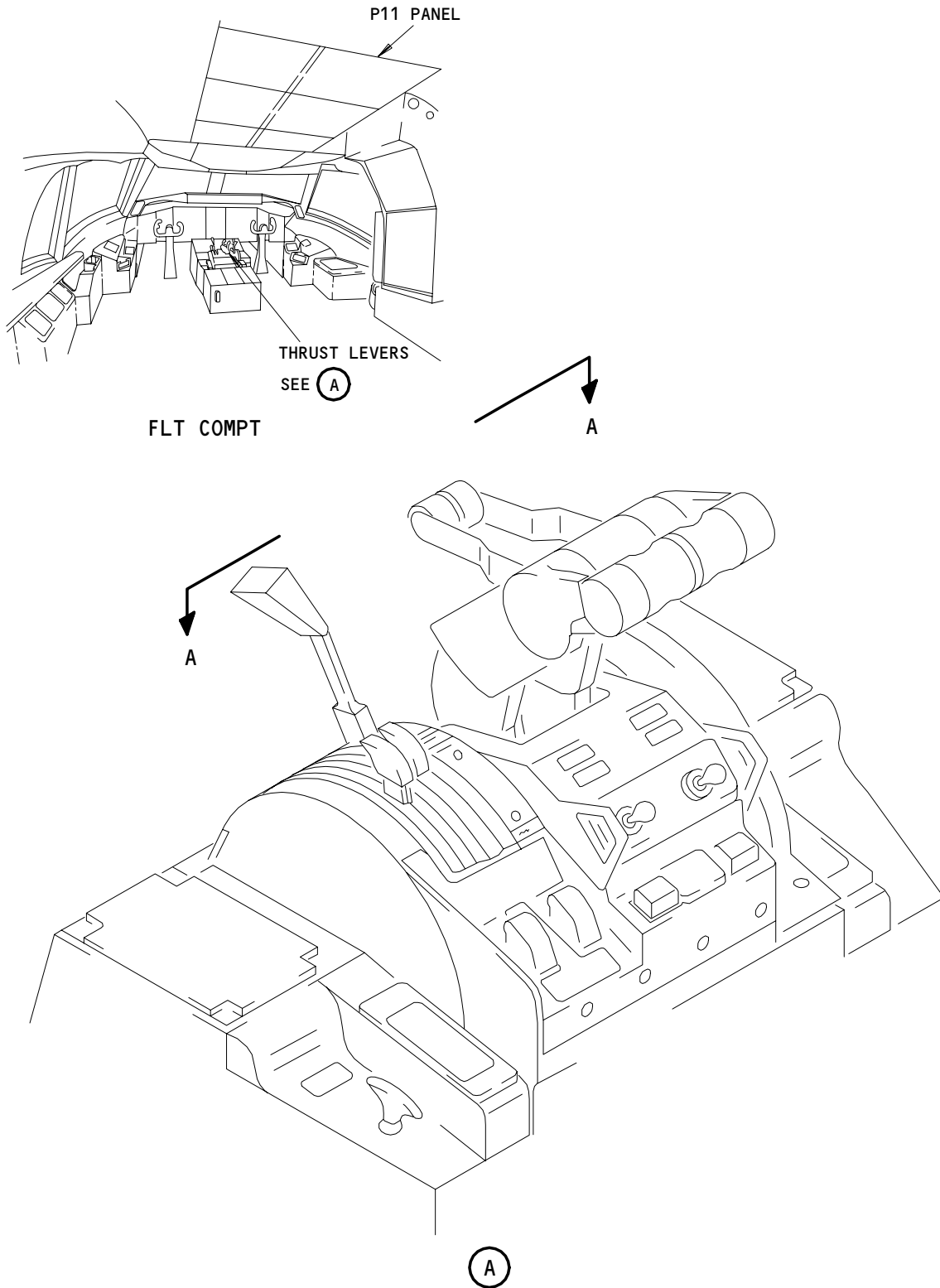
- (10) Install the rail, the center cover seal, and the cover seal onto the control stand.

S 863-002

- (11) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the overhead panel, P11:
(a) 11G11, AUTO SPEEDBRAKE

S 443-001

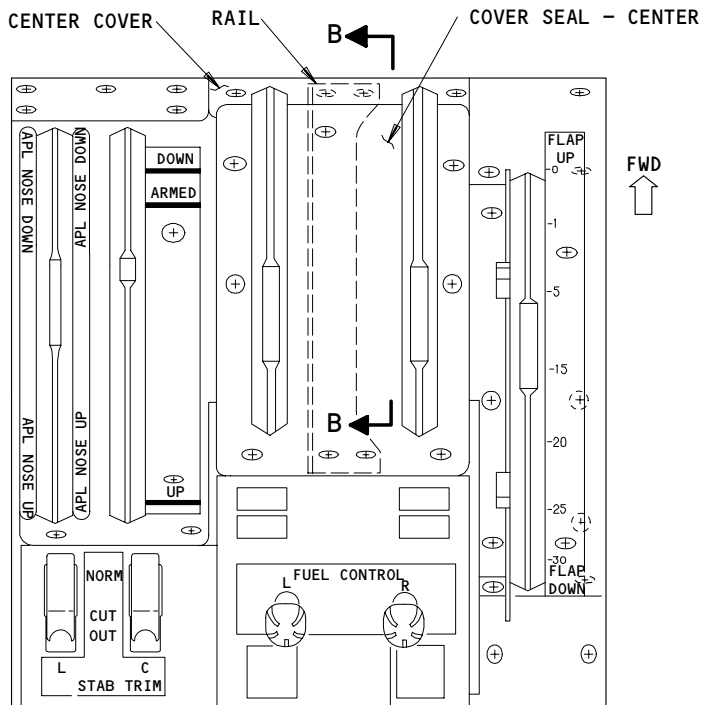
- (12) Do the Thrust Reverser Activation Procedure (AMM 78-31-00/201).



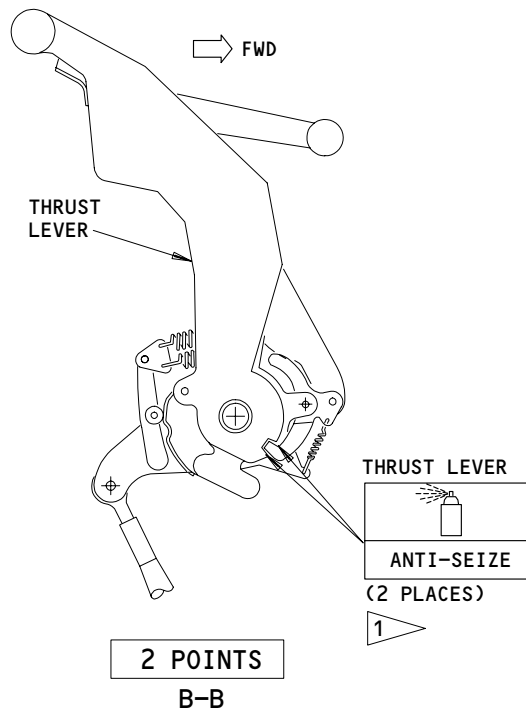
Thrust Lever Servicing
Figure 301 (Sheet 1)

EFFECTIVITY
AIRPLANES WITH TITANIUM THRUST LEVER
ASSEMBLY P/N 254N1131

12-21-25



(VIEW LOOKING DOWN)
THRUST LEVER
A-A



1 APPLY ANTI-SEIZE COMPOUND TO LATCH AND NOTCH

Thrust Lever Servicing
Figure 301 (Sheet 2)

EFFECTIVITY
AIRPLANES WITH TITANIUM THRUST LEVER
ASSEMBLY P/N 254N1131

12-21-25

EQUIPMENT COMPARTMENT AND EXTERIOR SERVICE DOORS – SERVICING (LUBRICATION)

1. General

- A. This procedure contains one task. The task is to lubricate the equipment compartment and exterior service doors.
- B. It is necessary to regularly lubricate the forward access door, electronics access door, environmental control systems doors, air driven pump access door, pressure relief panels, ground air supply access door, and hydraulic reservoir access door.

TASK 12-21-27-643-001

2. Lubricate the Equipment Compartment and Exterior Service Doors

A. Consumable Materials

- (1) D00633 Grease – BMS 3-33 (Preferred)
- (2) D00013 Grease – MIL-PRF-23827 (Alternate)
- (3) D00091 Oil, Lubricating – MIL-PRF-7870
- (4) D00068 Oil, Lubricating – MIL-PRF-23699

B. Access

- (1) Location Zone
 - 100 Lower Half of Fuselage
- (2) Access Panels
 - 113AL Forward Access Door
 - 119AL Electronics Access Door
 - 193NL Environmental Control Systems Door (Left)
 - 194LR Environmental Control Systems Door (Right)
 - 195SL Air Driven Pump Access Door
 - 193GL Pressure Relief Panel (Left)
 - 194HR Pressure Relief Panel (Right)
 - 193LL Ground Air Supply Access Door
 - 198CR Hydraulic Reservoir Access Door

C. Procedure – Lubricate the Equipment Compartment and Exterior Service Doors

S 643-002

- (1) Lubricate the forward access door (Views A and A-A, Fig. 301).

EFFECTIVITY

ALL

12-21-27

01

Page 301
Apr 22/04

- S 643-003
(2) Lubricate the electronics access door (Views B and B-B, Fig. 301).
- S 643-004
(3) Lubricate the environmental control systems doors (Fig. 302).
- S 643-005
(4) Lubricate the air driven pump access door (View A, Fig. 303).
- S 643-006
(5) Lubricate the pressure relief panels (View A, Fig. 304).
- S 643-007
(6) Lubricate the ground air supply access door (View B, Fig. 304).
- S 643-008
(7) Lubricate the hydraulic reservoir access door (View C, Fig. 304).

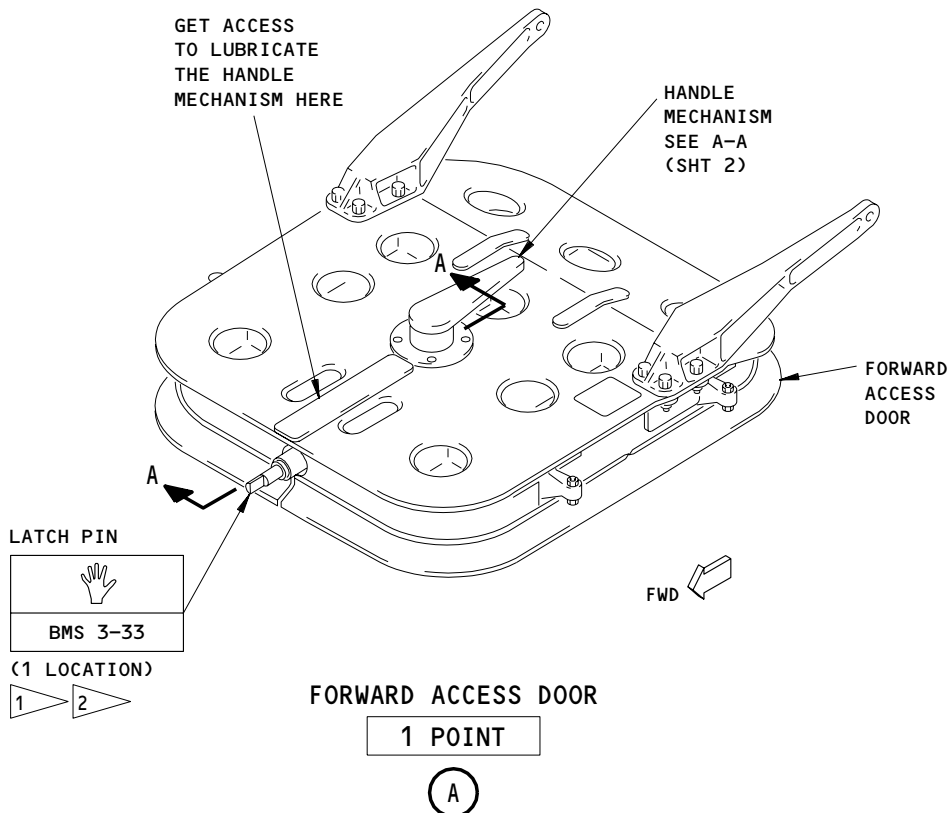
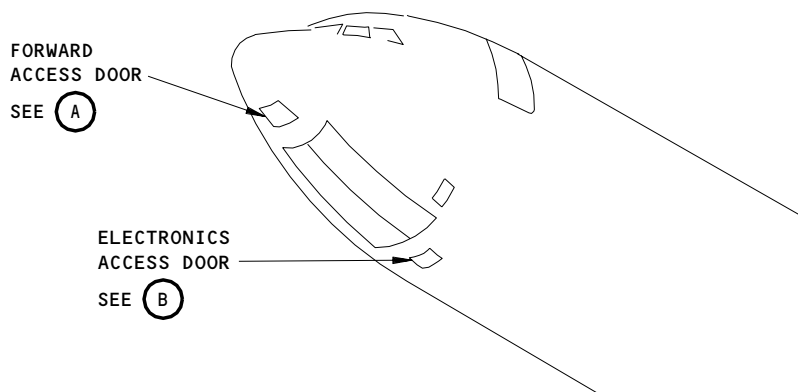
EFFECTIVITY

ALL

12-21-27

01

Page 302
May 10/90



- 1 LUBRICATE THE CHROME-PLATED LATCH PINS ONLY. IT IS NOT NECESSARY TO LUBRICATE THE LATCH PINS THAT HAVE DRI-LUBE ON THEM
- 2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

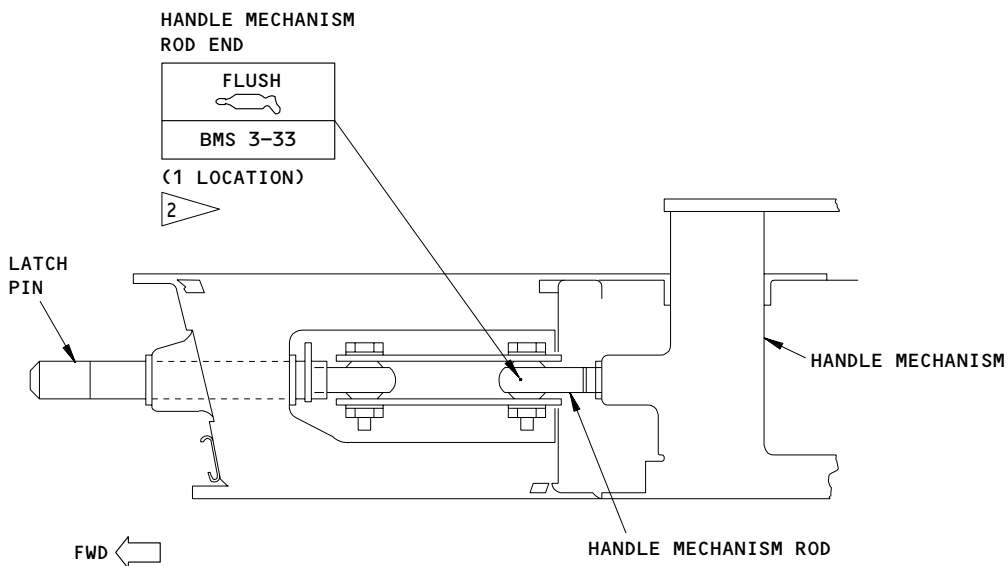
Forward Access Door and Electronics Access Door Lubrication
Figure 301 (Sheet 1)

EFFECTIVITY	
ALL	

12-21-27

01

Page 303
Aug 22/03



1 POINT
A-A

2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

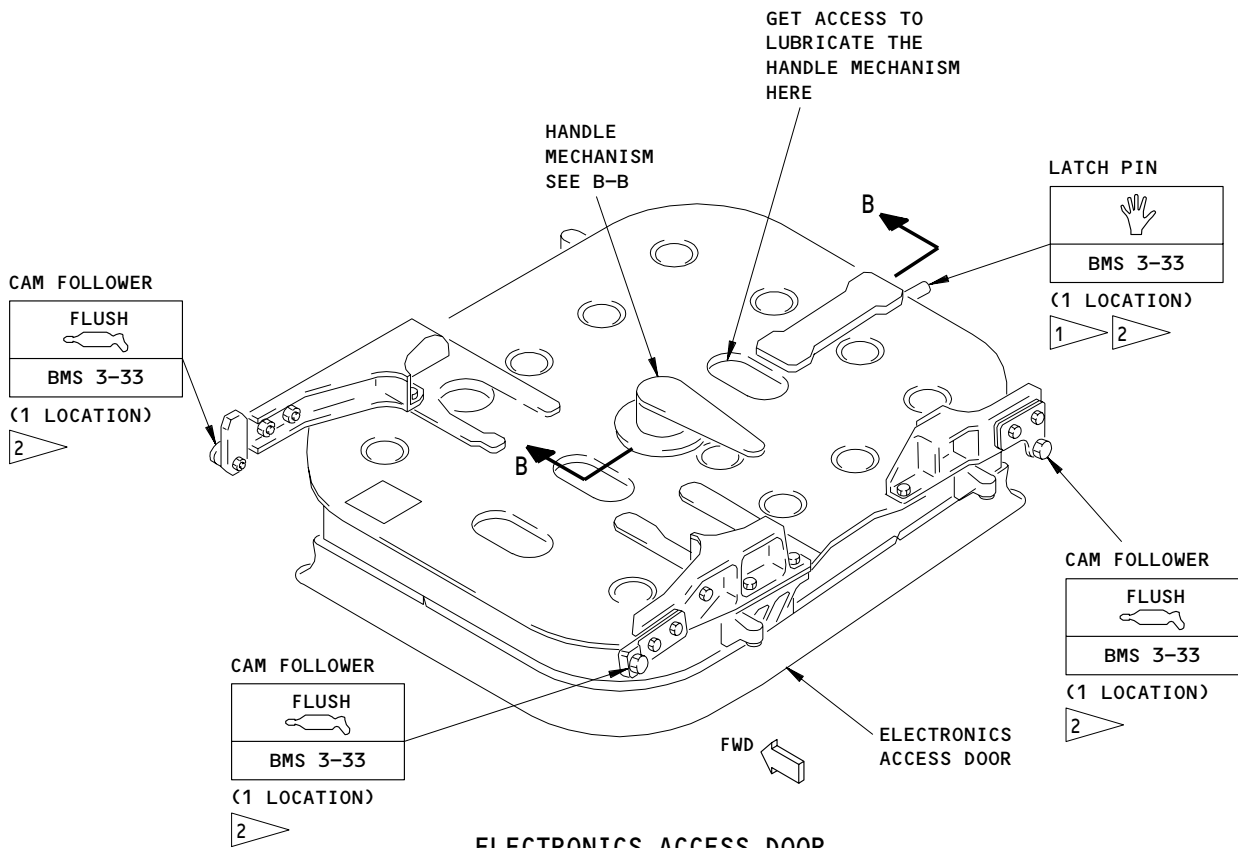
Forward Access Door and Electronics Access Door Lubrication
Figure 301 (Sheet 2)

EFFECTIVITY	ALL
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12-21-27

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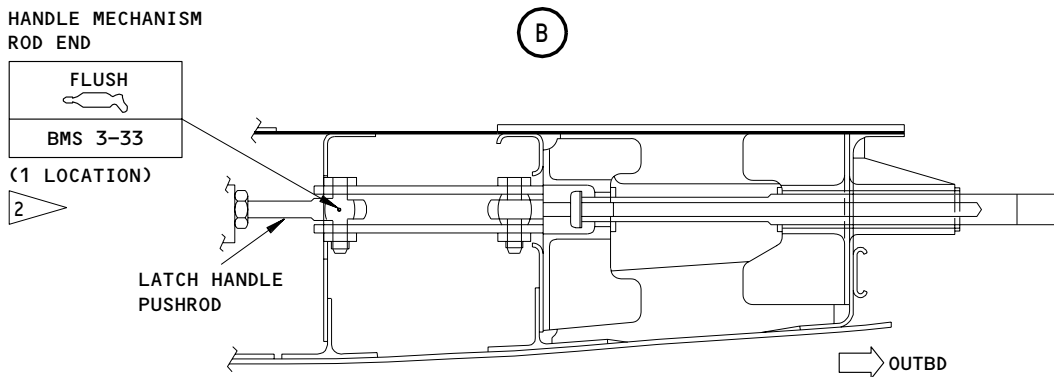
Page 304
Aug 22/03



ELECTRONICS ACCESS DOOR

4 POINTS

B



1 POINT

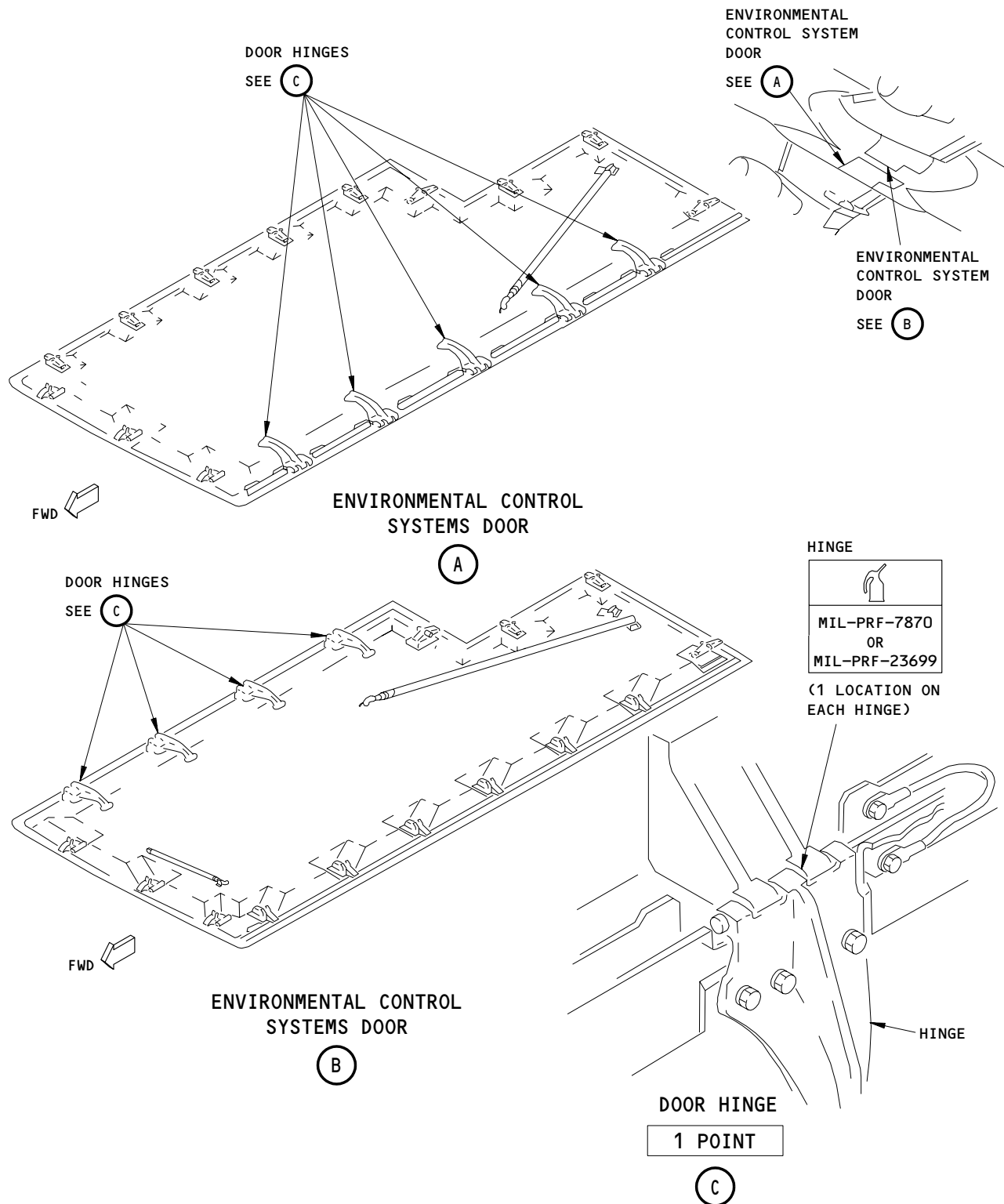
B-B

- 1 LUBRICATE THE CHROME-PLATED LATCH PINS ONLY. IT IS NOT NECESSARY TO LUBRICATE THE LATCH PINS THAT HAVE DRI-LUBE ON THEM
- 2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Forward Access Door and Electronics Access Door Lubrication
Figure 301 (Sheet 3)

EFFECTIVITY	ALL
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12-21-27



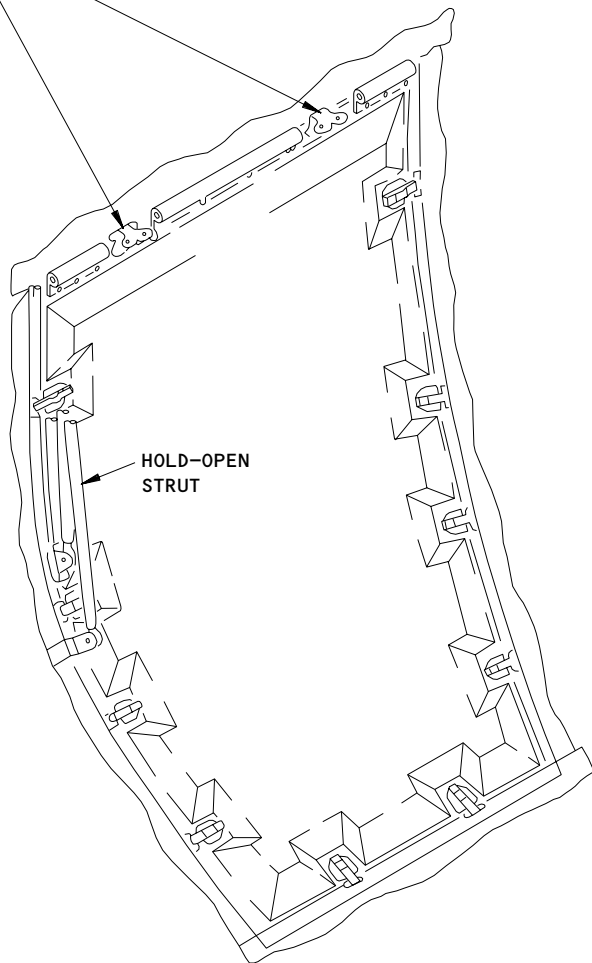
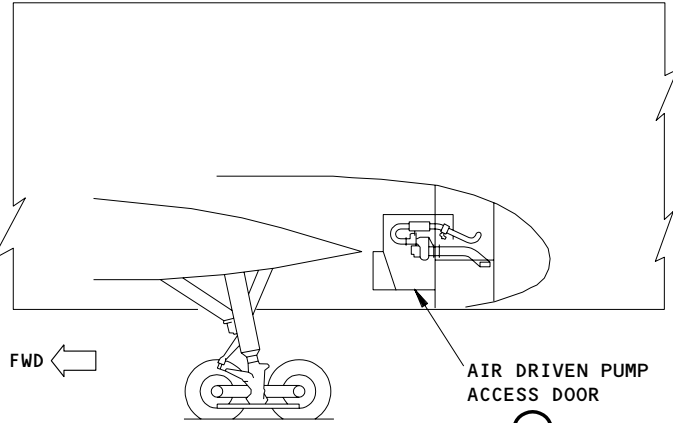
Environmental Control Systems Door Lubrication
Figure 302

EFFECTIVITY	ALL

12-21-27

AIR DRIVEN PUMP
ACCESS DOOR


MIL-PRF-7870 OR MIL-PRF-23699 (2 LOCATIONS)



AIR DRIVEN PUMP ACCESS DOOR
2 POINTS

(A)

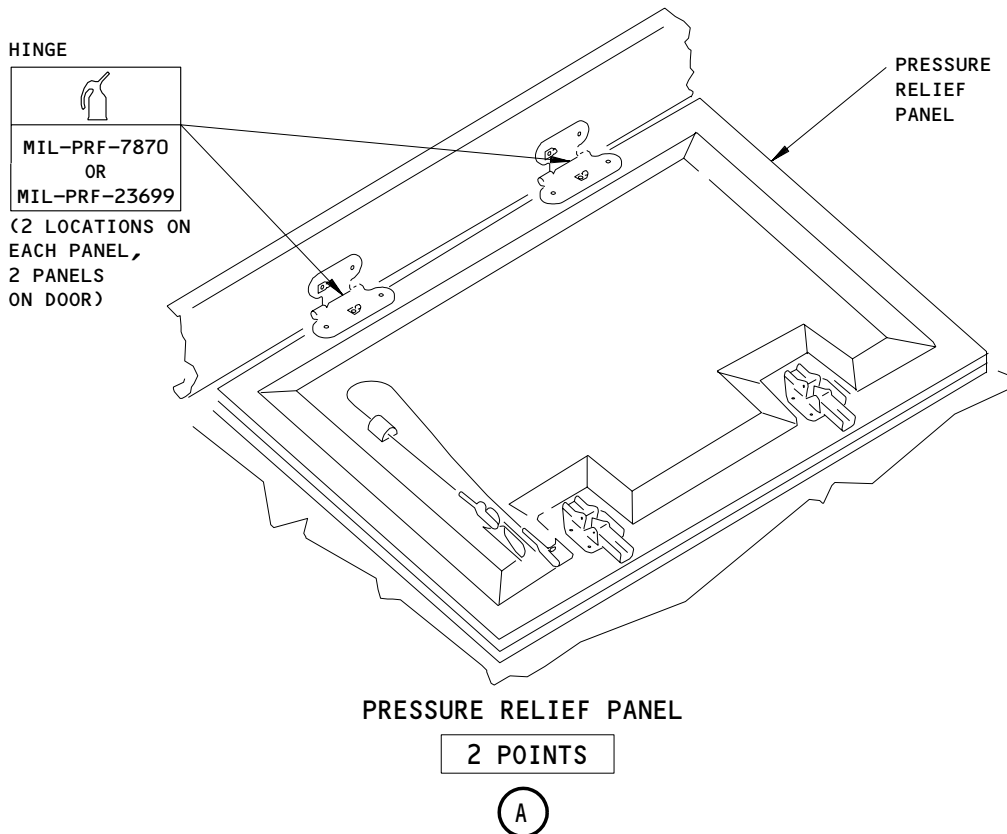
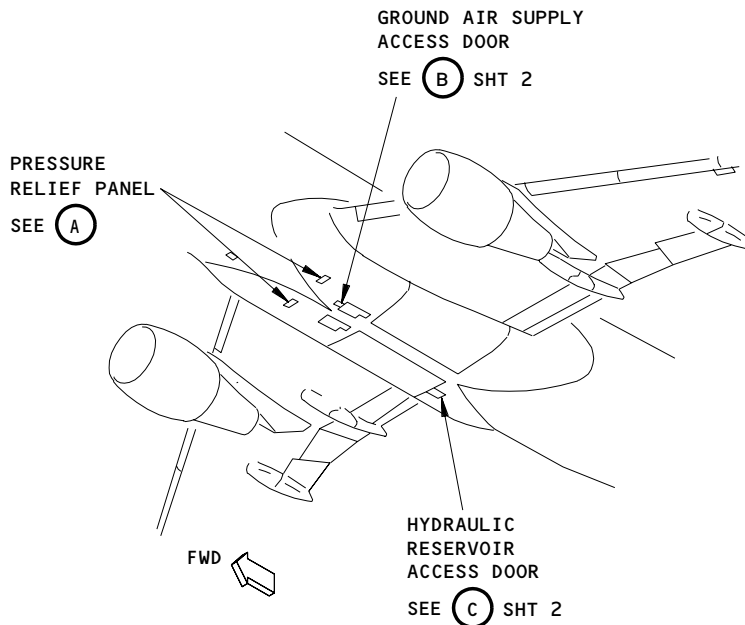
Air Driven Pump Access Door Lubrication
Figure 303

EFFECTIVITY	ALL
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12-21-27

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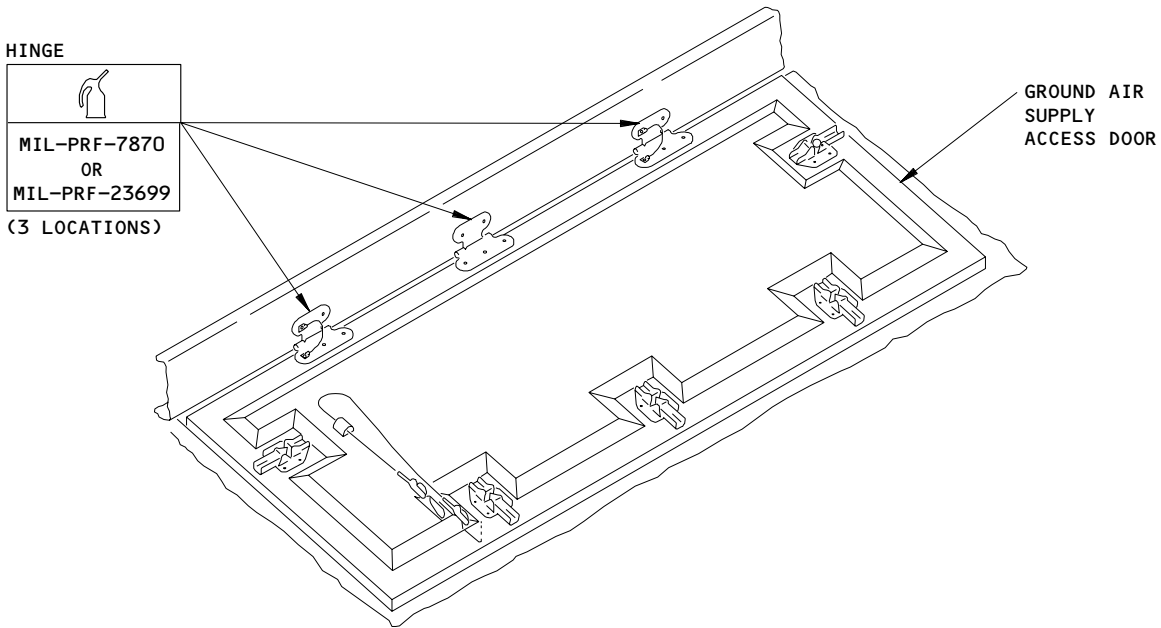
Exterior Service Doors Lubrication
Figure 304 (Sheet 1)

EFFECTIVITY	ALL
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12-21-27

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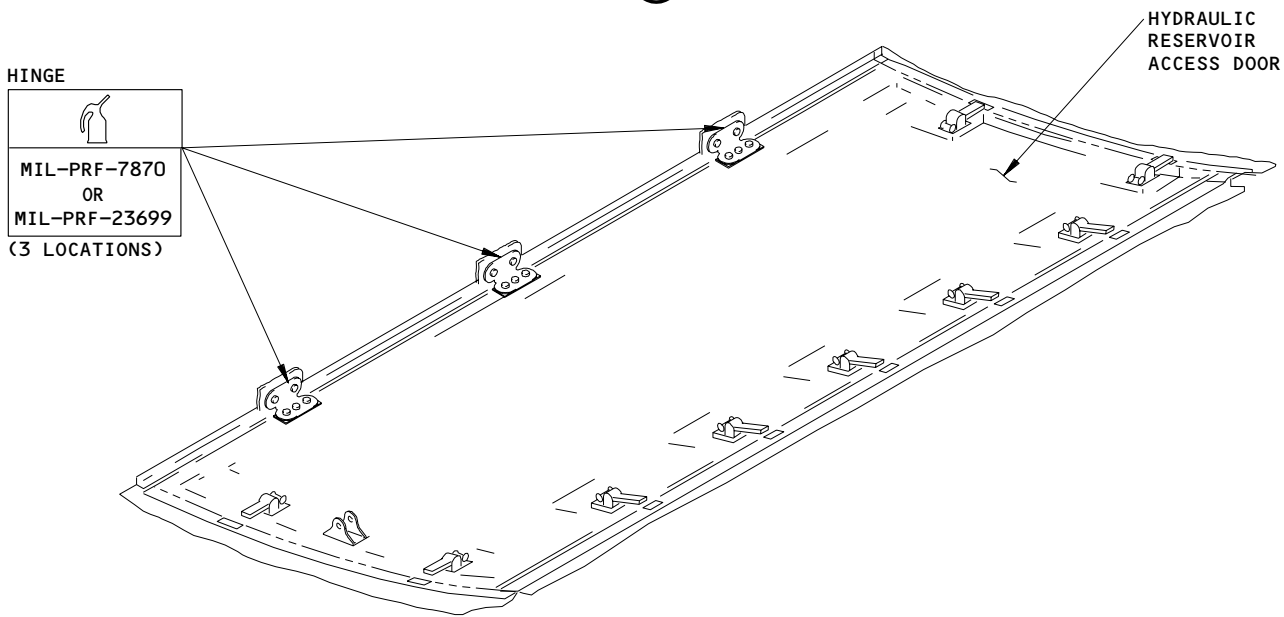
Page 308
Apr 22/04



GROUND AIR SUPPLY ACCESS DOOR

3 POINTS

(B)



HYDRAULIC RESERVOIR ACCESS DOOR

3 POINTS

(C)

Exterior Service Doors Lubrication
Figure 304 (Sheet 2)

EFFECTIVITY

ALL

12-21-27

01

Page 309
Apr 22/04

589871

RAM AIR TURBINE (RAT) - SERVICING

1. General

- A. This procedure has one task. This task lubricates the ram air turbine (RAT).

TASK 12-21-30-643-001

2. Lubricate the Ram Air Turbine (RAT) (Fig. 301)

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
(2) D00013 Grease, MIL-PRF-23827 (Alternate).

B. References

- (1) AMM 29-21-00/201, Ram Air Turbine (RAT) System

C. Access

- (1) Location Zone
198 Wing-to-Body- Aft Lower Half (Right)
- (2) Access Panel
198GR Ram Air Turbine

D. Procedure

- S 863-002
(1) Extend the ram air turbine (RAT) (AMM 29-21-00/201).
- S 643-003
(2) Lubricate the bearings and the bushings as shown.
- S 863-004
(3) Retract the ram air turbine (RAT) (AMM 29-21-00/201).

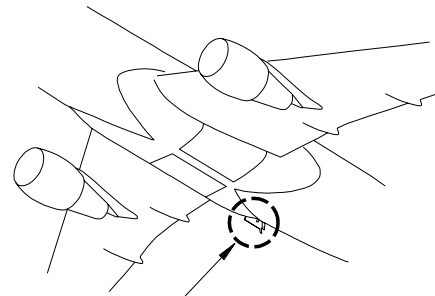
EFFECTIVITY

ALL

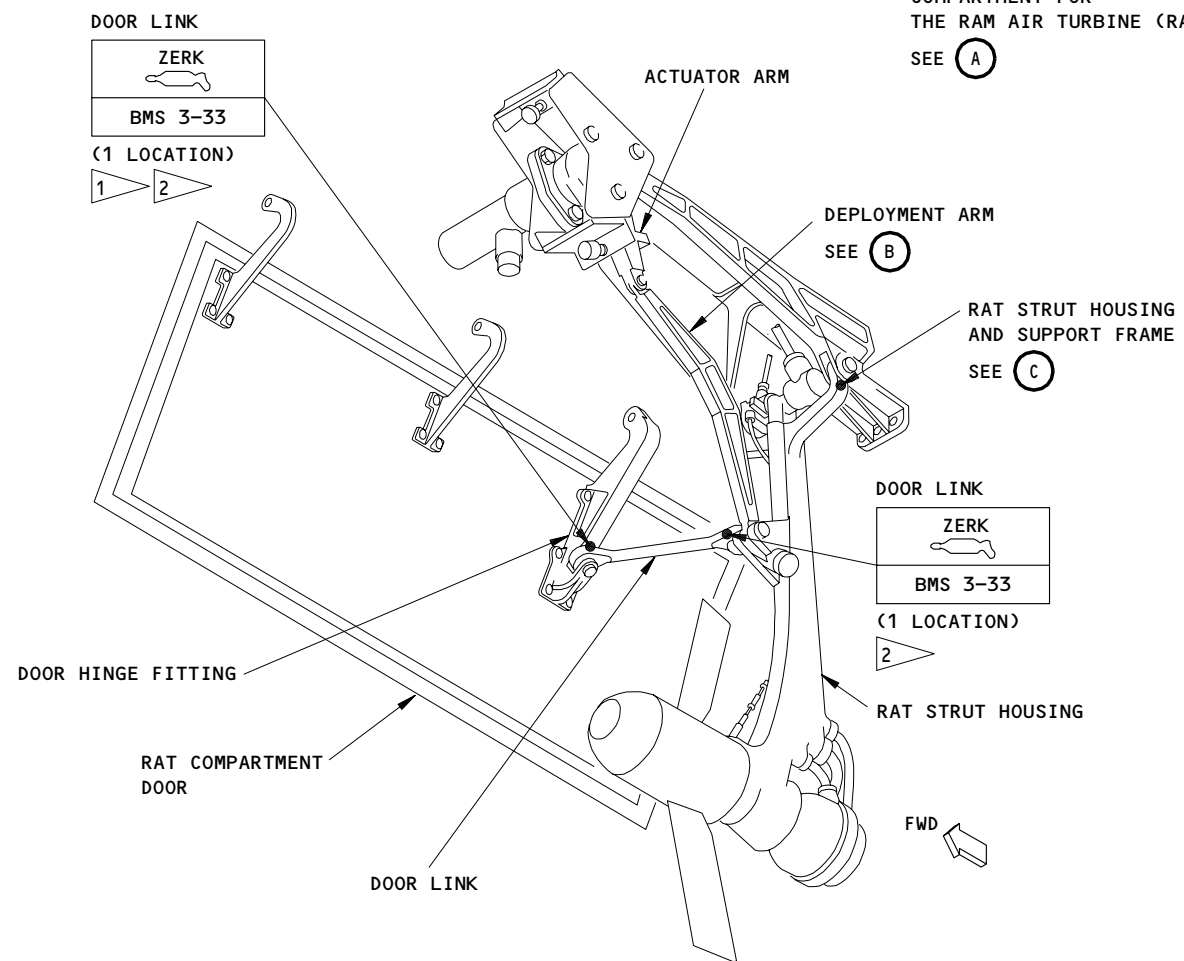
12-21-30

01

Page 301
Apr 22/05



COMPARTMENT FOR THE RAM AIR TURBINE (RAT)
SEE (A)



COMPARTMENT FOR THE RAM AIR TURBINE (RAT)

2 POINTS

(A)

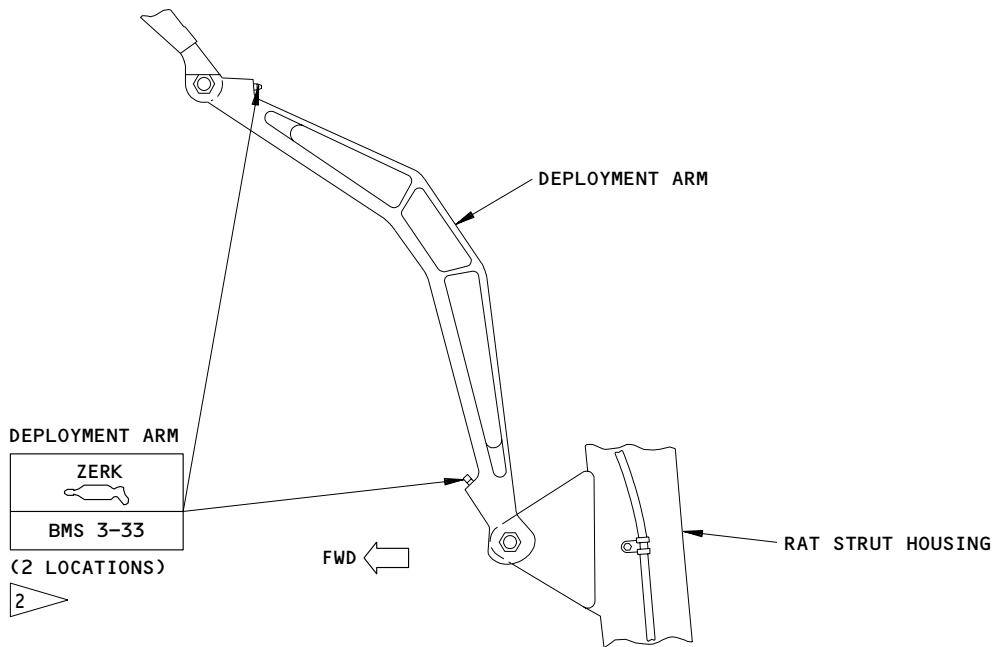
- 1 A ZERK FITTING IS ON THE TWO SIDES OF THE ROD END ON THE DOOR LINK. LUBRICATE ONLY ONE ZERK FITTING.
- 2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Ram Air Turbine (RAT) Lubrication
Figure 301 (Sheet 1)

EFFECTIVITY	ALL
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12-21-30

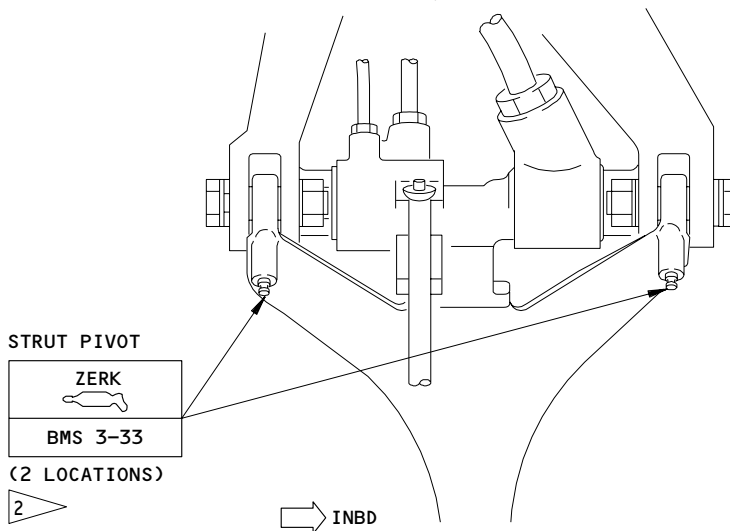
25038



DEPLOYMENT ARM

2 POINTS

(B)



RAT STRUT HOUSING AND SUPPORT FRAME

2 POINTS

(C)

2 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

Ram Air Turbine (RAT) Lubrication
Figure 301 (Sheet 2)

EFFECTIVITY

ALL

12-21-30

01

Page 303
Aug 22/03

CONTROL CABLES - SERVICING (LUBRICATION)

TASK 12-21-31-643-001

1. Control Cables - Lubrication

A. Consumable Materials

- (1) D00633 Grease, general purpose airplane grease, corrosion preventive, BMS 3-33 (preferred)
- (2) D00015 Grease, airplane ball and roller bearings, corrosion preventive, BMS 3-24 (alternative)

B. Lubricate the Control Cables - Carbon Steel Cables

S 163-002

- (1) Use a dry cloth to remove the used lubricant and all unwanted material from the surface of the control cable. Do this for the full length of the cable travel through the fairleads, air pressure seals, on pulleys, quadrants, and drums.

S 643-010

- (2) Move the control cable full travel in one direction, stop and then apply grease to the control cable. Then move the control cable full travel in the opposite direction, stop and then apply grease again to the control cable.

S 643-005

CAUTION: DO NOT CLEAN THE CABLES WITH A SOLVENT OR MIXED GREASE. THE SOLVENT OR MIXED GREASE WILL REMOVE GREASE FROM THE CABLES. IT CAN ALSO MAKE THE GREASE TOO THIN.

- (3) Use an applicator or a brush to make the layer of lubricant smooth along the full length of the cable.

NOTE: Stainless steel cables must not be lubricated.

NOTE: Make sure you can see at a minimum a thin strip of grease in the bottom of the grooves in the cable. The grooves must be full of grease in the areas where friction occurs.

S 993-008

- (4) Look at the applicable maintenance manual section given in Table 301 for information on cable routing.

EFFECTIVITY

ALL

12-21-31

02

Page 301
Apr 22/06

 **BOEING**
767
MAINTENANCE MANUAL

Table 301	
CONTROL CABLES	CHAPTER SECTION/SUBJECT
Flight Control Cables	27-00-01/201
Landing Gear Control Cables	32-00-25/201
Entry/Service Door Counterbalance	52-11-16/401

EFFECTIVITY

ALL

12-21-31

03

Page 302
Aug 22/01

STRUT - SERVICING (LUBRICATION)

1. General

- A. This section gives lubrication instructions for the strut-to-wing attach fittings.

TASK 12-21-32-643-001

2. Lubricate the Strut-to-Wing Attach Fittings

A. Equipment

- (1) Lubrication adapter - A12005-1, attach fittings, wing nacelle

B. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
(2) D00013 Lubricant, MIL-PRF-23827 (Alternate)

C. References

- (1) AMM 06-43-00/201, Engine and Nacelle Strut (Major Zone 400) Access Doors and Panels
(2) AMM 78-31-00/201, Thrust Reverser System

D. Access

- (1) Location Zones
411 Left Engine
421 Right Engine

E. Lubricate Wing Nacelle Attach Fittings (Fig. 301)

S 043-002

WARNING: DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY AND DAMAGE TO EQUIPMENT

- (1) Do the deactivation procedure for the thrust reverser for ground maintenance (AMM 78-31-00/201).

S 013-013

- (2) Open the access panels (437BL, 447BL, 437BR, 447BR, 437CL, 447CR) (AMM 06-43-00/201).

S 493-011

- (3) Remove the end coupler from the flexible hose of grease gun and put on the curved end of the lubrication adapter.

S 643-009

- (4) Use the lubrication adapter and a grease gun to lubricate the strut-to-wing attach points that follow:
- diagonal brace to wing
- midspar fitting to wing (inboard)
- midspar fitting to wing (outboard)

EFFECTIVITY

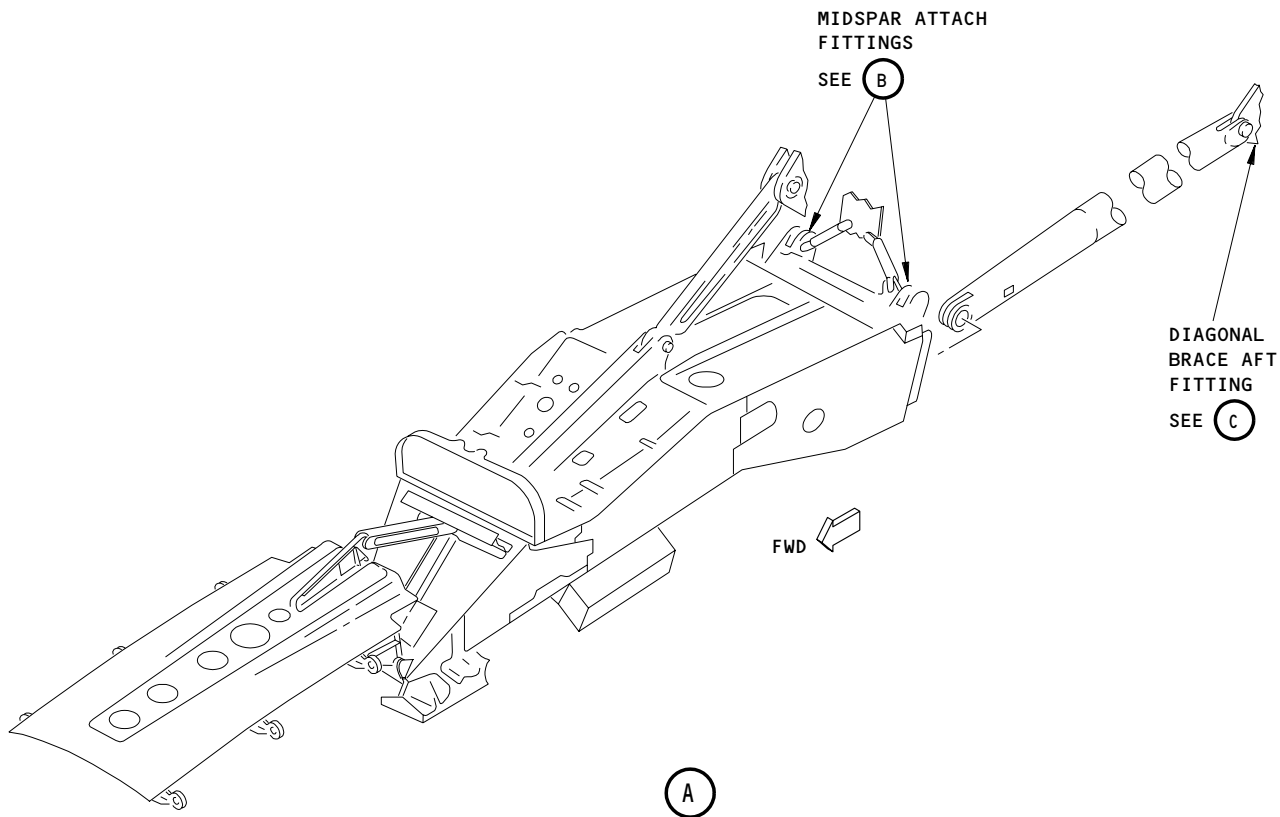
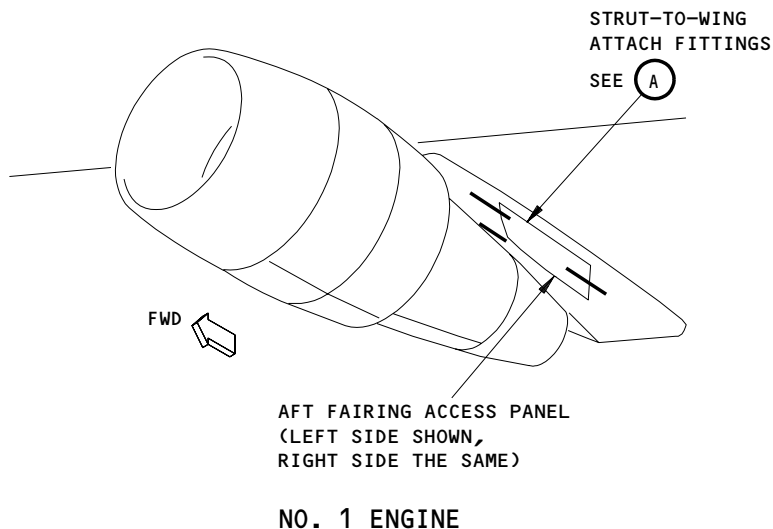
ALL

12-21-32

01

Page 301
Apr 22/04

BOEING
767
MAINTENANCE MANUAL



Strut-to-Wing Attach Fittings Lubrication
Figure 301 (Sheet 1)

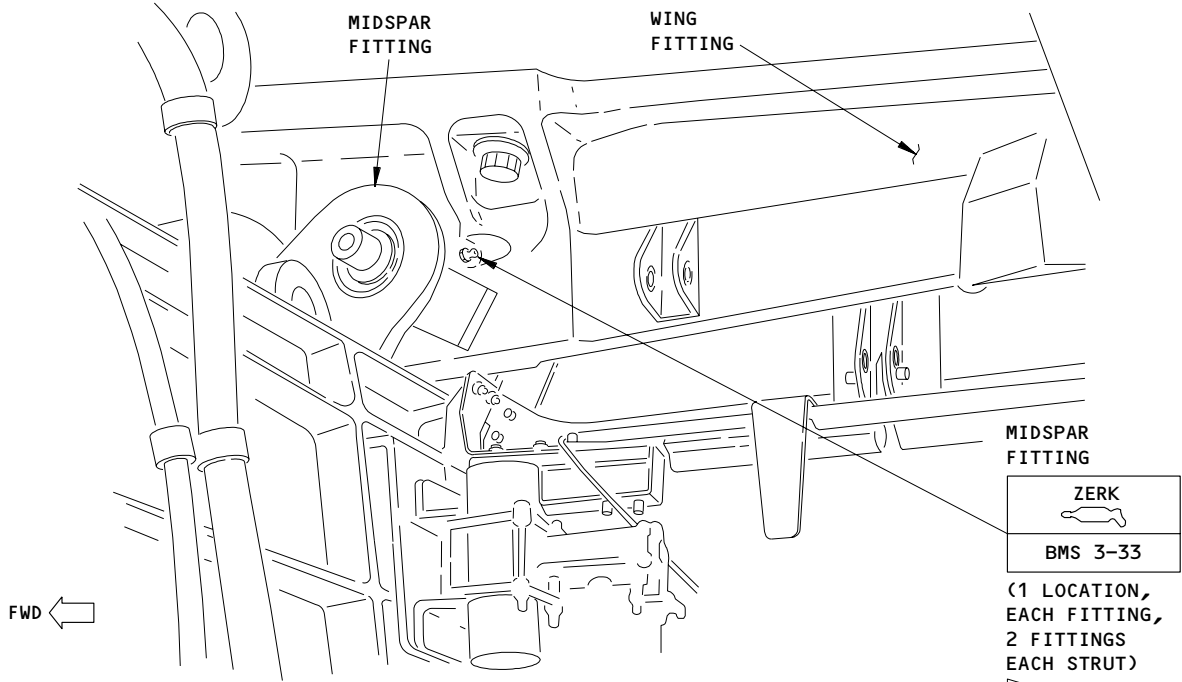
EFFECTIVITY	
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12-21-32

01

Page 302
Apr 22/04

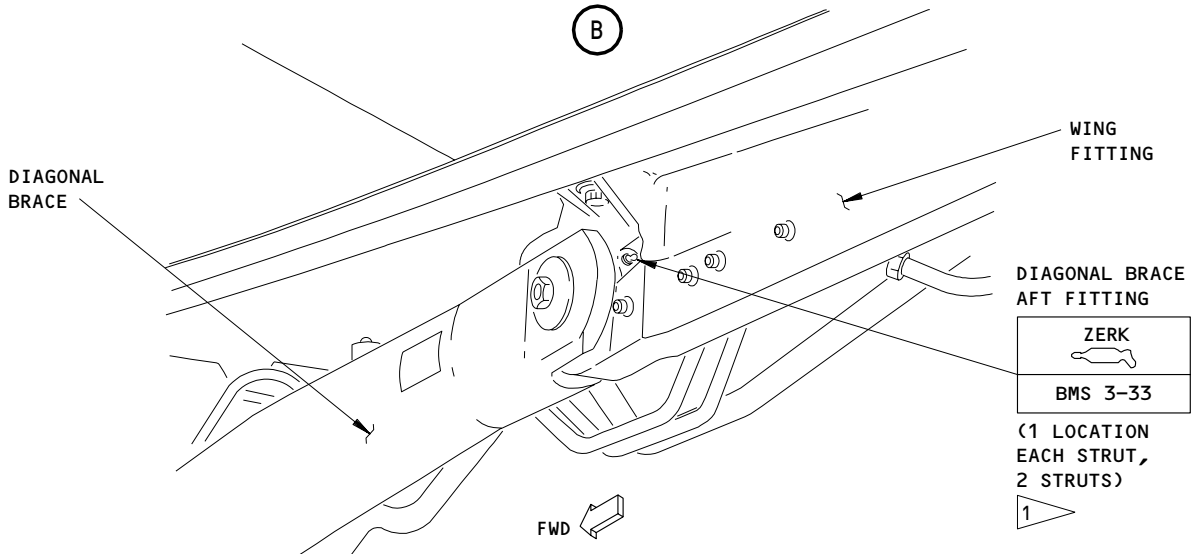
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NO. 1 ENGINE
(VIEW IN THE INBOARD DIRECTION OF THE AFT FAIRING ACCESS PANEL)

1 POINT

(B)



(VIEW IN THE INBOARD DIRECTION OF THE AFT FAIRING ACCESS PANEL)

1 POINT

(C)

1 BMS 3-33 (RECOMMENDED)
MIL-PRF-23827 (ALTERNATE)

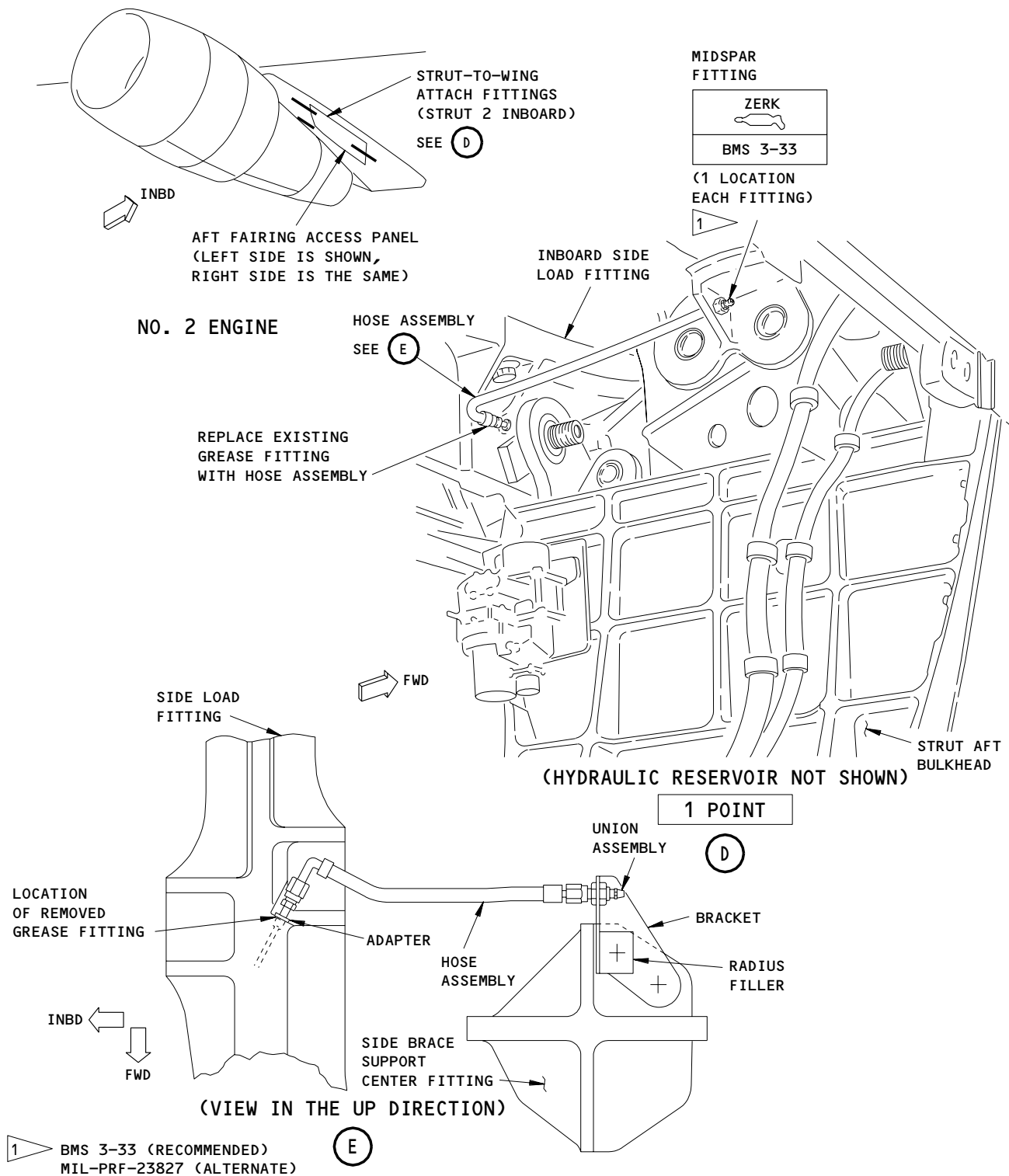
Strut-to-Wing Attach Fittings Lubrication
Figure 301 (Sheet 2)

EFFECTIVITY
ALL

12-21-32

01

Page 303
Apr 22/04



Strut-to-Wing Attach Fittings Lubrication
Figure 301 (Sheet 3)

EFFECTIVITY
AIRPLANES WITH
SB 767-57-0040.

12-21-32

- S 413-008
- (5) Close the access panels.
- S 043-007
- (6) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

EFFECTIVITY

ALL

12-21-32

01

Page 305
Apr 10/98

CONTAINERIZED CARGO HANDLING SYSTEM – SERVICING

1. General

- A. This procedure contains one task. The task gives instructions to apply the lubricant to the cargo system components.

TASK 12-21-33-613-001

2. Containerized Cargo Handling System Servicing

A. Consumable Materials

- (2) D00091 Oil – Lubricating – MIL-L-7870

B. Access

(1) Location Zones

- | | |
|---------|---------------------------|
| 121/122 | Forward Cargo Compartment |
| 153/154 | Aft Cargo Compartment |

(2) Access Panels

- | | |
|-----|--------------------------------|
| 821 | Forward Cargo Compartment Door |
| 822 | Aft Cargo Compartment Door |

C. Procedure

S 643-002

- (1) Lubricate the roller shaft, the cam follower, and the pawl on the rollout stop (Fig. 301).

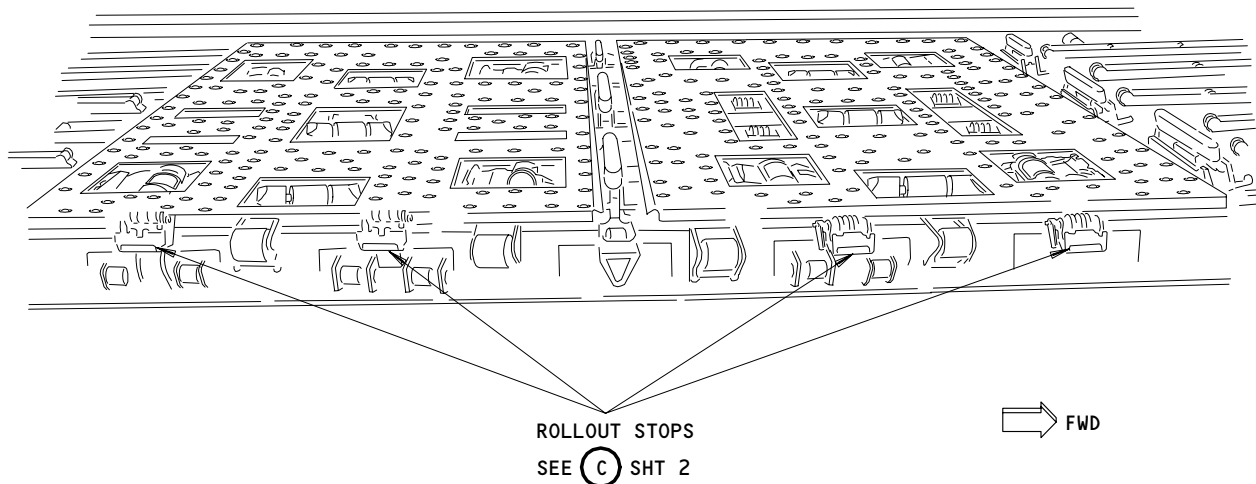
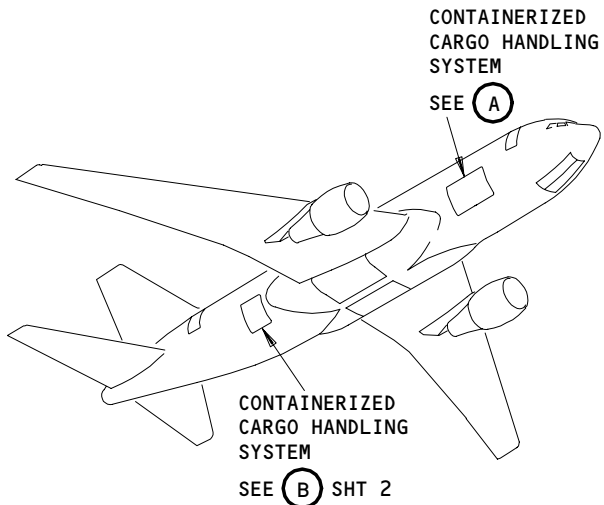
EFFECTIVITY

ALL

12-21-33

05

Page 301
Dec 22/06



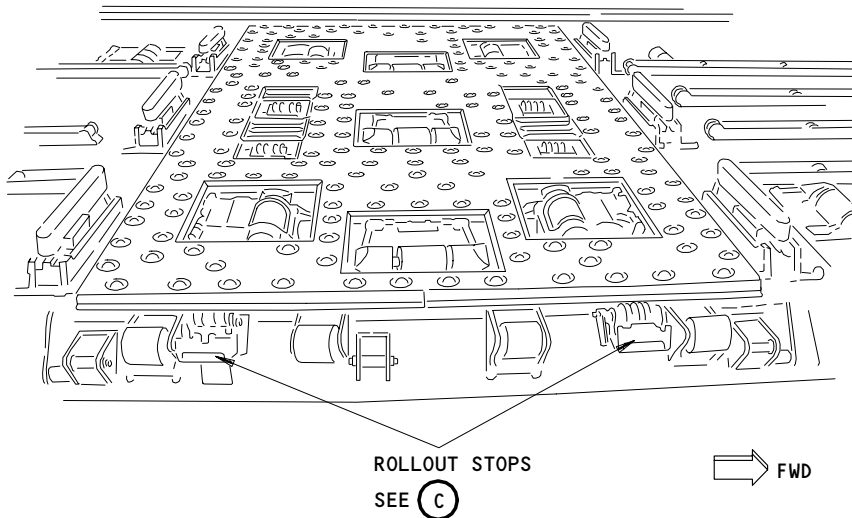
FWD CARGO COMPARTMENT FLOOR
(VIEW FROM CARGO DOORWAY)

(A)

Containerized Cargo Handling System Lubrication
Figure 301 (Sheet 1)

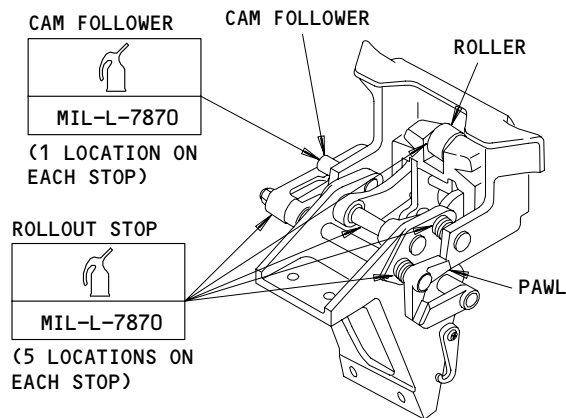
EFFECTIVITY	
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12-21-33



AFT CARGO COMPARTMENT FLOOR
(VIEW FROM CARGO DOORWAY)

(B)



ROLLOUT STOP
(4 IN THE FWD COMPT)
(2 IN THE AFT COMPT)

6 POINTS

(C)

Containerized Cargo Handling System Lubrication
Figure 301 (Sheet 2)

EFFECTIVITY	
	ALL

12-21-33

NO.2 WINDOW - SERVICING (LUBRICATION)

1. General

- A. This procedure contains one task. The task is to lubricate the ballscrew on the No. 2 flight compartment window.

TASK 12-21-34-643-003

2. Lubricate the Ballscrew

A. Consumable Materials

- (1) D00633 Grease - BMS 3-33 (Preferred)
- (2) D00015 Grease - BMS 3-24 (Aeroshell 16)
- (3) G00099 Paper - Grade A, Type 2, Class 2 (Grease-proof)

B. Access

- (1) Location Zones
211/212 Control Cabin - Section 41

C. Procedure

S 433-001

- (1) Put paper below the ballscrew assembly to keep the lubricant away from the lower interior equipment.

S 643-002

- (2) Apply the BMS 3-33 or BMS 3-24 lubricant to the ballscrew through the top outboard side of the lower aft track.

EFFECTIVITY

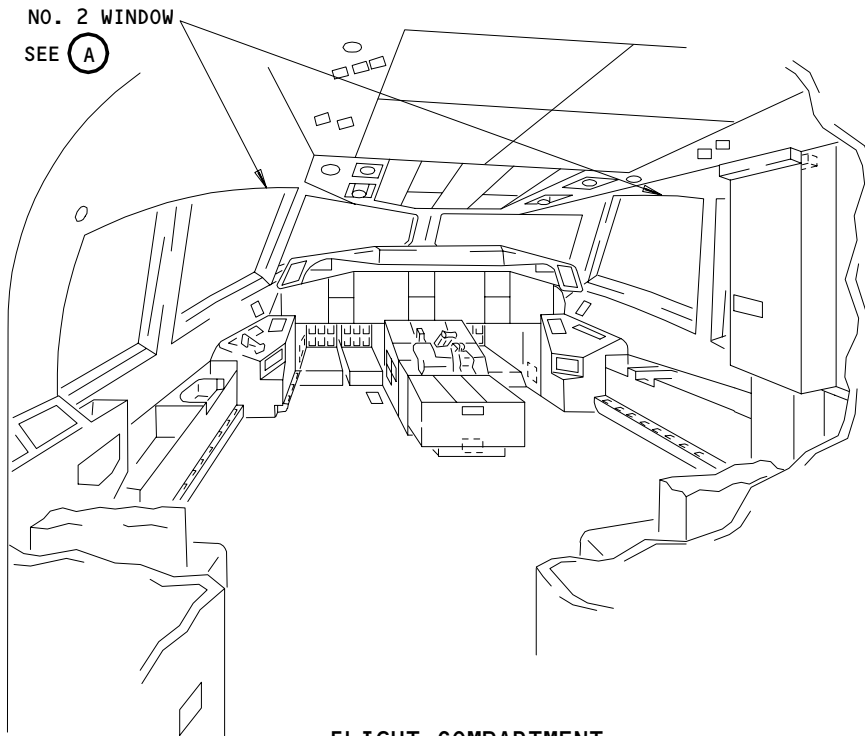
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12-21-34

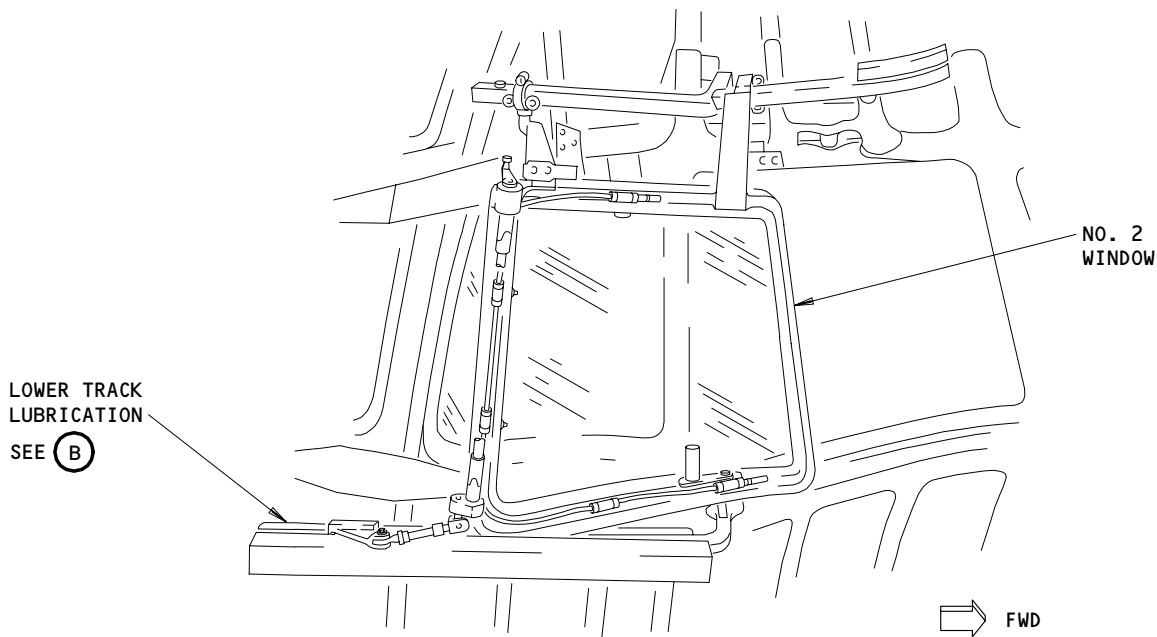
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Page 301
Dec 22/02

BOEING
767
MAINTENANCE MANUAL



FLIGHT COMPARTMENT



LEFT NO. 2 WINDOW SHOWN
(RIGHT WINDOW IS ALMOST THE SAME)

(A)

No. 2 Window Lubrication
Figure 301 (Sheet 1)

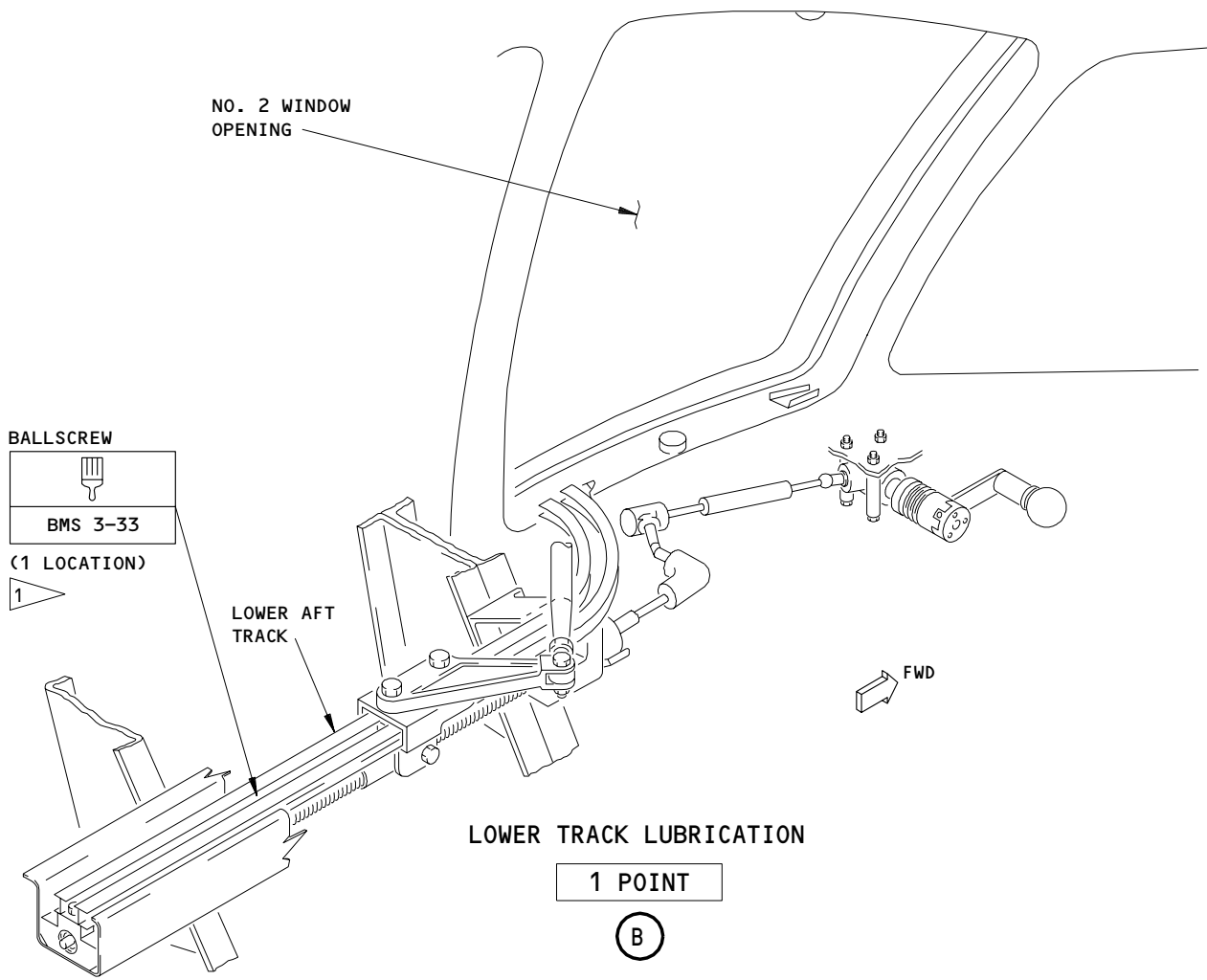
EFFECTIVITY	
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12-21-34

01

Page 302
May 10/90

585957



1 BMS 3-33 (RECOMMENDED)
BMS 3-24 (ALTERNATE)

No. 2 Window Lubrication
Figure 301 (Sheet 2)

EFFECTIVITY	
	ALL

12-21-34

ENGINE - SERVICING (OIL CHANGE)

1. General

- A. This procedure contains three subtasks. The subtasks are to drain, flush and fill the oil system.
- B. Refer to PW SB 238 for information on approved oil brands, oil types, and instructions for changeover to a different brand or type of oil.

TASK 12-22-01-613-001

2. Engine Oil Servicing Procedure (Oil Change) (Fig. 301)

A. Equipment

- (1) Container - 10 U.S. gallon (38 liter) capacity, for oil
- (2) Adapter, Oil Sampler - PWA 86018 (Optional)

B. Consumable Materials

- (1) D00405 Lubricant - Antigalling, PWA 550-3 (P06-021), HT-T-650, Lubri-Bond HT
- (2) D00137 Oil - Aircraft Turbine Engine, Synthetic Base, PWA 521 (P03-001)

C. References

- (1) AMM 12-13-01/301, Engine - Oil Servicing
- (2) AMM 71-00-00/201, Power Plant
- (3) AMM 71-11-04/201, Fan Cowl Panels
- (4) AMM 71-11-06/201, Core Cowl Panels
- (5) AMM 72-34-03/401, Fan Exit Liner Segment
- (6) AMM 78-31-00/201, Thrust Reverser System
- (7) AMM 79-11-03/201, Engine Oil Tank Cap
- (8) AMM 79-21-05/401, Main Oil Filter
- (9) AMM 79-21-10/401, Magnetic Chip Detector

D. Access

(1) Location Zones

- 411 Left Engine
- 421 Right Engine

(2) Access Panels

- 415AL Fan Reverser (Left)
- 416AR Fan Reverser (Right)
- 425AL Fan Reverser (Left)
- 426AR Fan Reverser (Right)

E. Prepare to Do the Oil Servicing Procedure

S 013-002

- (1) Open the fan cowl panels (AMM 71-11-04/201).

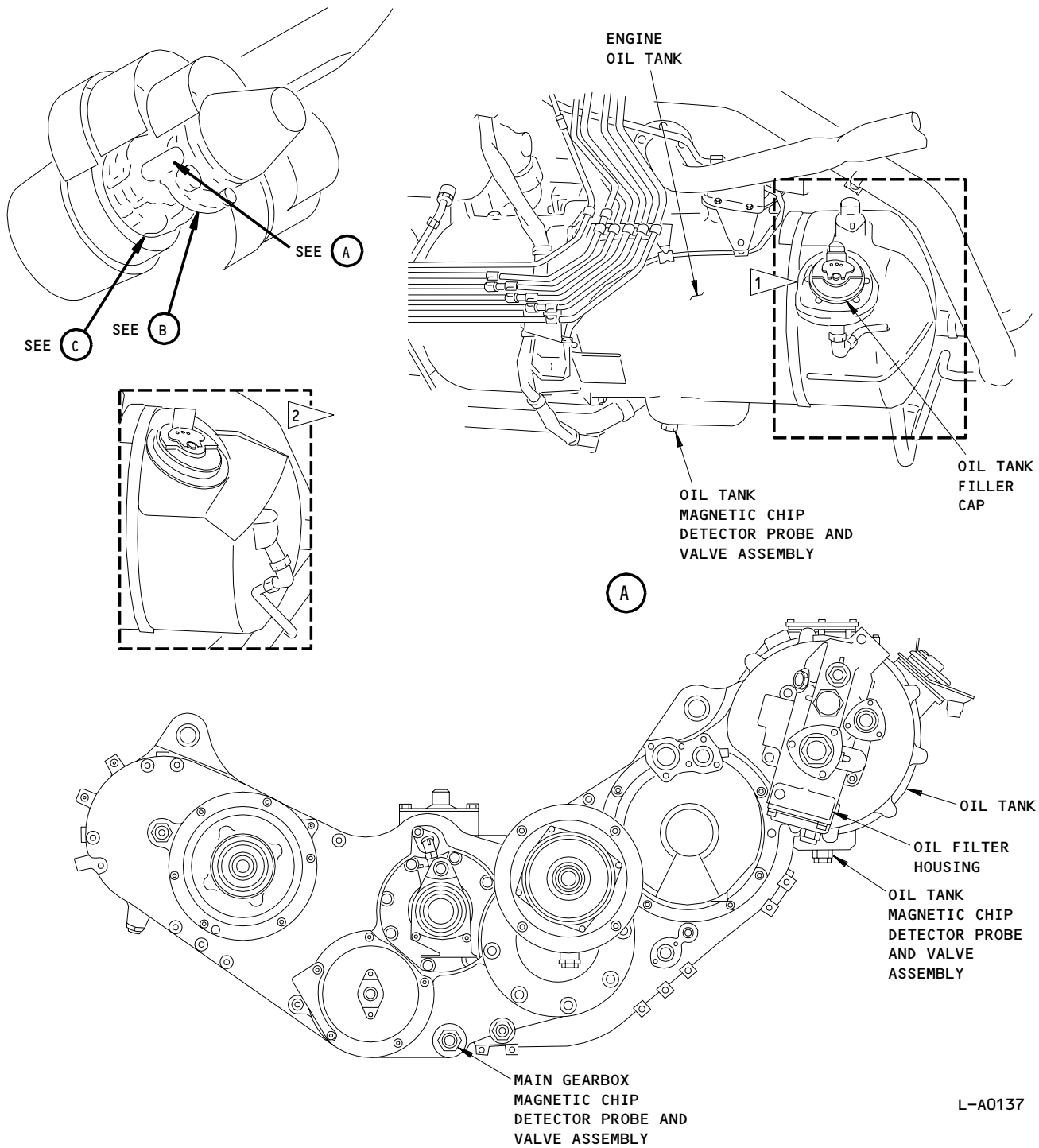
EFFECTIVITY

ALL

12-22-01

01C

Page 301
Apr 22/06



FRONT VIEW OF THE MAIN GEARBOX

- 1 ENGINES PRE-PW-SB 79-65
- 2 ENGINES POST-PW-SB 79-65

Engine Oil Servicing
Figure 301 (Sheet 1)

L-A0137

EFFECTIVITY

ALL

12-22-01

01C

Page 302
Dec 10/98

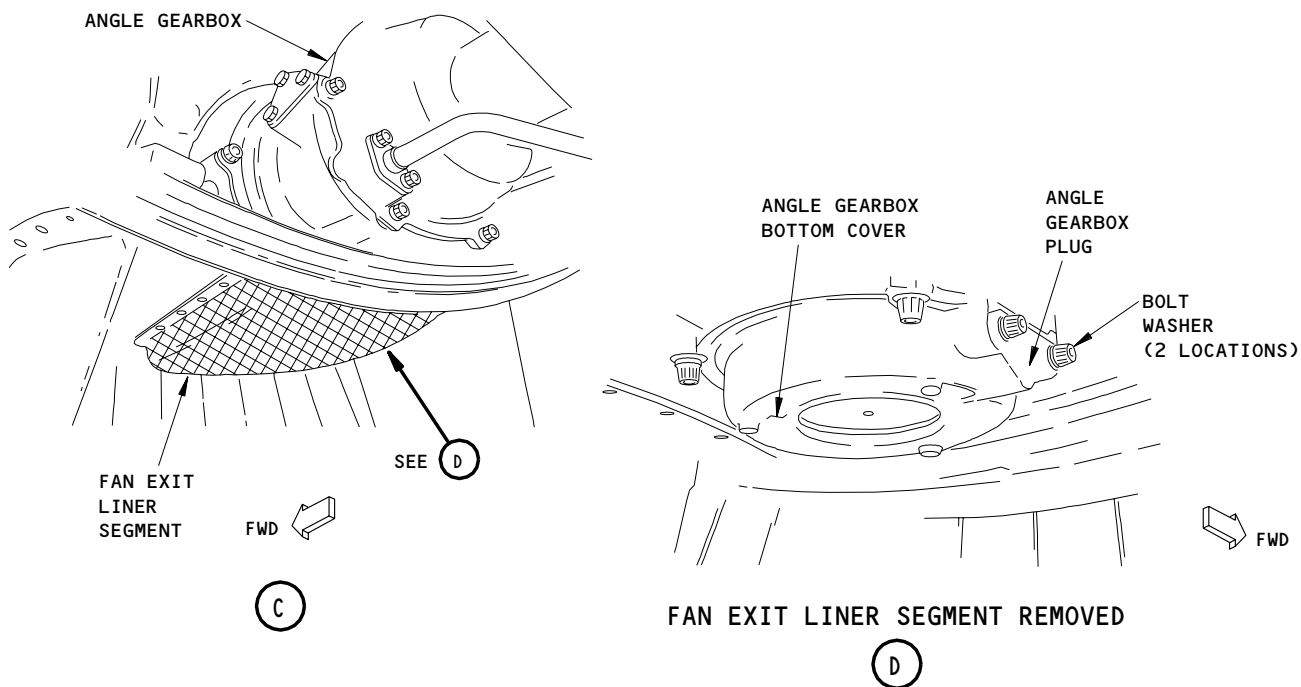
S 043-003

WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 013-004

- (3) Open the core cowl panels (AMM 71-11-06/201).



L-A4108

Engine Oil Servicing
Figure 301 (Sheet 2)

EFFECTIVITY	ALL
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12-22-01

01C

Page 303
Dec 10/98

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S 013-005

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Open the thrust reversers (AMM 78-31-00/201).

F. Drain the Engine Oil System

S 033-006

WARNING: BEFORE YOU OPEN THE OIL TANK CAP, PERMIT A MINIMUM OF FIVE MINUTES AFTER ENGINE SHUTDOWN TO LET THE PRESSURE IN THE OIL TANK BLEED OFF. A FAST FLOW OF HOT OIL CAN OCCUR AND CAUSE INJURY TO YOU.

WARNING: DO NOT KEEP THE OIL ON YOUR SKIN FOR A LONG TIME. IF YOU DO NOT CLEAN THE OIL OFF, THE OIL CAN CAUSE INJURY.

CAUTION: THE SPECIFIED OIL USED IN THIS OIL SYSTEM CAN CAUSE DAMAGE TO THE PAINT AND SOME TYPES OF RUBBER. YOU MUST NOT PERMIT THE OIL TO TOUCH THOSE PARTS OF THE ENGINE WHICH DO NOT USUALLY TOUCH THE OIL. YOU MUST IMMEDIATELY CLEAN THE OIL WHICH FALLS OUT OF THE CONTAINER DURING SERVICING.

CAUTION: DO NOT MOTOR THE ENGINE WHEN THE ENGINE OIL IS DRAINED. IF IT IS MOTORED WITHOUT ANY OIL IN THE OIL SYSTEM, DAMAGE TO THE ENGINE CAN OCCUR.

(1) Remove the oil tank cap (AMM 79-11-03/201).

S 683-007

(2) Put the containers below the magnetic chip detectors (MCD) of the oil tank and the main gearbox.

S 683-008

(3) Put a container below the drain plug of the angle gearbox.

EFFECTIVITY

ALL

12-22-01

01C

Page 304
Aug 22/01

S 683-009

- (4) Remove the magnetic chip detector assemblies from the oil tank and the main gearbox to drain the engine oil (AMM 79-21-10/401).

NOTE: You can use the PWA 86018 Adapter to drain the engine oil from the oil tank. If you use the PWA 86018 Adapter, remove only the MCD probe.

- (a) If you use the PWA 86018 Adapter, do the steps that follow:
1) Install the PWA 86018 Adapter in the location of the MCD probe.
2) Permit the engine oil to drain.

S 683-010

- (5) Remove the angle gearbox plug as follows to drain the oil from the angle gearbox.
(a) Put a container below the angle gearbox plug.
(b) Remove the fan exit liner segment at position 4 (AMM 72-34-03/401).
(c) Remove the bolts which attach the angle gearbox plug on the bottom cover of the angle gearbox.
(d) Remove the angle gearbox plug.
1) Discard the packing.

S 033-011

- (6) Remove the main oil filter (AMM 79-21-05/401).
(a) Discard the main oil filter.

S 683-012

- (7) Permit the oil to slowly fall off in drops from the drains for approximately 30 minutes.

S 433-013

- (8) Install a new main oil filter (AMM 79-21-05/401).

S 683-014

- (9) If you used the PWA 86018 Adapter to drain the oil tank or the main gearbox, remove the PWA 86018 Adapter.

S 433-015

- (10) Install the magnetic chip detector assemblies in the oil tank and main gearbox (AMM 79-21-10/401).

EFFECTIVITY

ALL

12-22-01

01C

Page 305
Dec 10/98

S 433-016

- (11) Install the angle gearbox plug.
- (a) Lubricate the new packing with engine oil.
 - (b) Install the new packing on the angle gearbox plug.
 - (c) Lubricate the threads of the bolts with antigalling lubricant.
 - (d) Install the bolts and the washers which attach the angle gearbox plug to the bottom cover of the angle gearbox.
 - 1) Tighten the bolts to 62-72 pound-inches (7.0-8.1 newton-meters).
 - (e) Install the fan exit liner segment at position 4 (AMM 72-34-03/401).

G. Flush the Engine Oil System

NOTE: It is only necessary to flush the engine oil system if the engine oil system has contamination.

S 613-017

- (1) Fill the engine oil system (AMM 12-13-01/301).

NOTE: It is not necessary to motor the engine and fill the oil tank when you flush the engine oil system.

S 413-018

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (2) Close the thrust reversers (AMM 78-31-00/201).

S 413-019

- (3) Close the fan cowl panels (AMM 71-11-04/201).

S 863-020

- (4) Operate the engine until the oil pressure is stable (AMM 71-00-00/201).

S 863-021

- (5) Stop the engine (AMM 71-00-00/201).

S 683-022

- (6) Drain the engine oil system with use of the steps from above.

EFFECTIVITY

ALL

12-22-01

01C

Page 306
Apr 22/06

H. Fill the Engine Oil System

S 613-023

- (1) Fill the engine oil system (AMM 12-13-01/301).

I. Put the airplane back to its initial condition

S 413-024

WARNING: OBEY THE INSTRUCTIONS IN AMM 78-31-00/201 WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Close the thrust reversers (AMM 78-31-00/201).

S 413-027

- (2) Close the core cowl panels (AMM 71-11-06/201).

S 413-025

- (3) Close the fan cowl panels (AMM 71-11-04/201).

S 443-026

- (4) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

EFFECTIVITY

ALL

12-22-01

01C

Page 307
Aug 22/01

ENGINE STARTER – SERVICING (OIL CHANGE)

1. General

- A. The engine starter oil is replaced regularly. The quality and quantity of the drained oil and metal particles on the magnetic chip detector can show you the condition of the starter. If you find pieces of pins, lockwire, castings, or other large pieces, it will be necessary to remove the starter to examine it more.

TASK 12-22-02-603-018

2. Engine Starter Servicing (Oil Change)

A. General

- (1) This procedure includes the steps to do a gravity fill of the starter.

B. Equipment

- (1) Container – 30 ounces minimum capacity for oil.

C. Consumable Materials

- (1) D00071 Lubricant – MIL-PRF-7808 (optional to MIL-PRF-23699).
(2) D00068 Lubricant – MIL-PRF-23699 (optional to MIL-PRF-7808).

D. References

- (1) AMM 71-11-04/201, Fan Cowl Panels
(2) AMM 71-11-06/201, Core Cowl Panels
(3) AMM 78-31-00/201, Thrust Reverser System
(4) AMM 80-11-01/601, Pneumatic Starter

E. Access

(1) Location Zones

- 411 Engine (Left)
421 Engine (Right)

(2) Access Panels

- 415AL Fan Reverser (Left)
416AR Fan Reverser (Right)
425AL Fan Reverser (Left)
426AR Fan Reverser (Right)

F. Prepare for the Servicing of the Engine Starter

S 043-002

WARNING: DO THE DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) Do the deactivation procedure for the thrust reverser for ground maintenance (AMM 78-31-00/201).

EFFECTIVITY

ALL

12-22-02

01C

Page 301
Apr 22/04

S 013-005

- (2) Open the fan cowl panel (AMM 71-11-04/201).

S 013-006

- (3) Open the core cowl panel (AMM 71-11-06/201).

S 013-007

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (4) Open the thrust reverser (AMM 78-31-00/201).

G. Do the Engine Starter Servicing (Fig. 301).

S 943-009

- (1) Put the container below the starter.

S 863-024

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN FOR A LONG PERIOD OF TIME. YOU CAN ABSORB POISONOUS MATERIALS FROM THE OIL THROUGH YOUR SKIN.

CAUTION: IMMEDIATELY CLEAN ALL THE OIL THAT FALLS ON AIRCRAFT PARTS. THE OIL CAN CAUSE DAMAGE TO THE PAINT AND RUBBER PARTS.

CAUTION: DO NOT MIX OIL OF DIFFERENT TYPES OR BRAND NAMES. SOME OILS WILL CHEMICALLY CHANGE WHEN YOU MIX THEM. THIS CAN CAUSE DAMAGE TO THE STARTER.

- (2) Do the steps that follow to drain the oil from the starter.
- (a) Remove the magnetic chip detector from the oil fill plug.
 - 1) Discard the packing.
 - 2) Carefully examine the magnetic chip detector for metal particles.
 - a) Refer to AMM 80-11-01/601 if you find particles that are larger than 0.10 inch (2.54 mm) in their largest dimension.
 - (b) Remove the drain plug and the packing.
 - (c) Drain the oil into a clean container.
 - (d) Discard the packing.
 - (e) Examine the drained oil for metal particles (AMM 80-11-01/601).

NOTE: Small metal particles show normal wear. Large metal particles show internal damage. You must replace the starter if you find large metal particles.

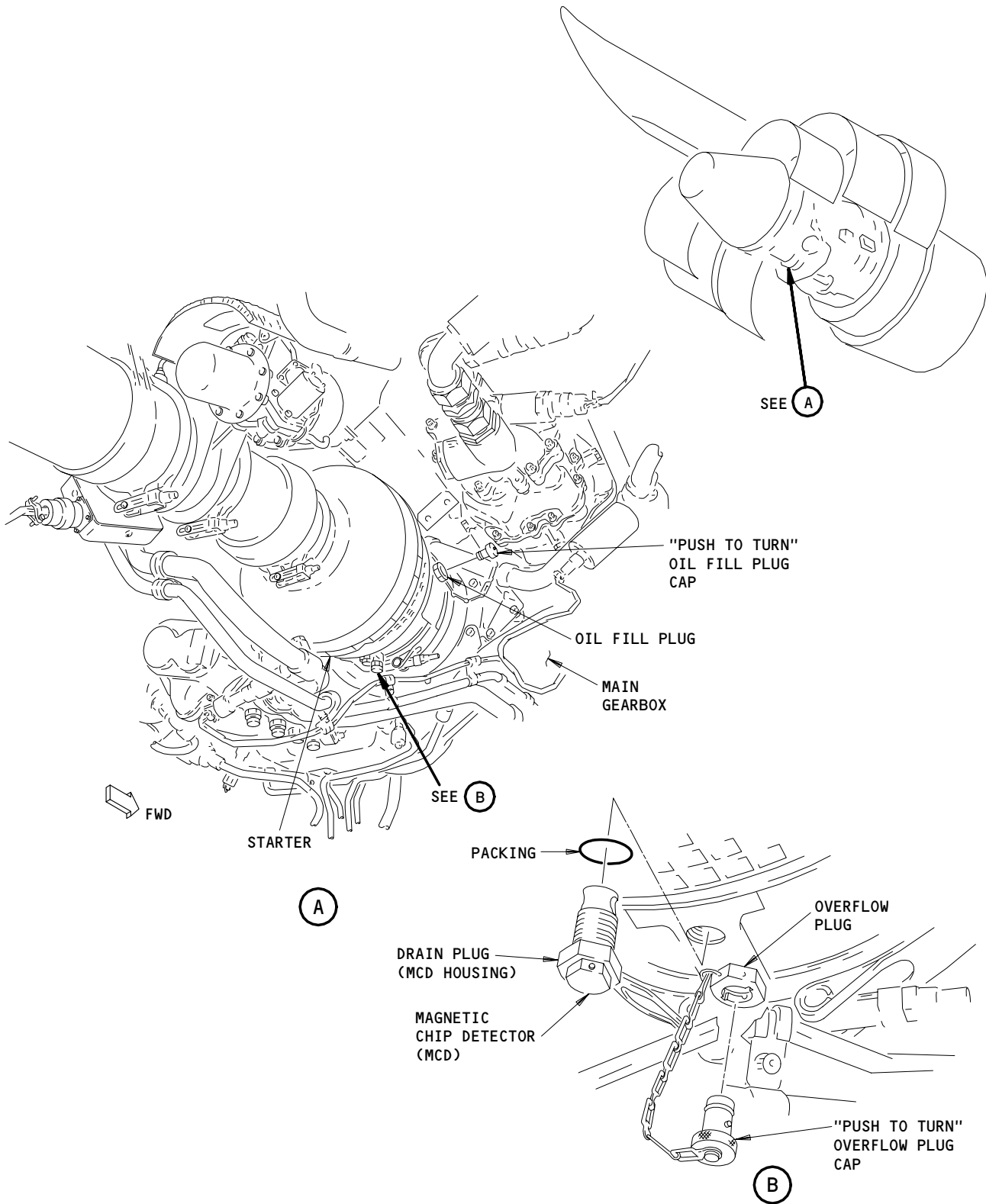
EFFECTIVITY

ALL

12-22-02

01C

Page 302
Aug 22/04



Engine Starter Oil Change
Figure 301

EFFECTIVITY

ALL

12-22-02

01C

Page 303
Aug 22/04

953627

CAUTION: REPLACE THE STARTER IF THE QUANTITY OF OIL THAT WAS DRAINED IS LESS THAN 17 FLUID OUNCES (503 ML). THE STARTER IS NOT SERVICEABLE ANYMORE IF YOU DRAIN LESS THAN THIS QUANTITY.

- (f) Make sure the quantity of the drained oil in the container is not less than 17 fluid ounces (503 ml).
- (g) Install a new packing, lubricated with oil, on the drain plug.
- (h) Install the drain plug.
 - 1) Tighten the drain plug to 70–80 pound-inches (7.9–9.0 newton-meters).
- (i) Install a new packing, lubricated with engine oil, on the magnetic chip detector.
- (j) Install the magnetic chip detector.
 - 1) Tighten the magnetic chip detector to 8–24 pound-inches (0.9–2.7 newton-meters).
- (k) Install lockwire on the drain plug and the magnetic chip detector.

S 613-027

WARNING: DO NOT LET THE OIL STAY ON YOUR SKIN FOR A LONG PERIOD OF TIME. YOU CAN ABSORB POISONOUS MATERIALS FROM THE OIL THROUGH YOUR SKIN.

CAUTION: IMMEDIATELY CLEAN ALL THE OIL THAT FALLS ON AIRCRAFT PARTS. THE OIL CAN CAUSE DAMAGE TO THE PAINT AND RUBBER PARTS.

CAUTION: DO NOT MIX OIL OF DIFFERENT TYPES OR BRAND NAMES. SOME OILS WILL CHEMICALLY CHANGE WHEN YOU MIX THEM. THIS CAN CAUSE DAMAGE TO THE STARTER.

- (3) Do the steps that follow to gravity fill the starter with oil.
 - (a) To release the caps from the oil fill plug and the overflow plug, push the caps in and turn counterclockwise.
 - (b) Remove the caps.
 - (c) Add oil to the starter until oil flows from the overflow port.

NOTE: You can use a plastic bottle with a plastic tube in the oil fill port to slowly fill the starter. This will let the air come out of the starter and prevent an incorrect full indication.

The starter is full when approximately 22.5 fluid ounces (665 ml) of oil is added to the starter and oil starts to flow from the oil overflow port.

EFFECTIVITY

ALL

12-22-02

01C

Page 304
Aug 22/01

- (d) Install the caps on the oil fill plug and the overflow plug.

NOTE: For reference only, the torque value is 40-70 pound-inches (4.5-7.9 newton-meters) for the oil fill plug, and 20-40 pound-inches (2.3-4.5 newton-meters) for the overflow plug.

- 1) Put the caps on the plugs.
- 2) Push the caps in and turn clockwise until they lock.

S 143-012

- (4) Clean all unwanted oil from the surface of the starter.

S 413-013

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (5) Close the thrust reverser (AMM 78-31-00/201).

S 413-019

- (6) Close the core cowl panel (AMM 71-11-06/201).

S 413-016

- (7) Close the fan cowl panel (AMM 71-11-04/201).

S 443-017

- (8) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

EFFECTIVITY

ALL

12-22-02

01C

Page 305
Aug 10/93

AIR DRIVEN PUMP (ADP) – SERVICING

1. General

- A. This procedure has one task. This task replaces the oil in the gearbox of the air driven pump (ADP).

TASK 12-22-04-613-001

2. Replace the Oil in the Gearbox of the Air Driven Pump (ADP) (Fig. 301)

A. General

- (1) The oil reservoir is in the bottom of the gearbox between the hydraulic pump and the air turbine. The oil capacity of the gearbox is approximately 1100 cc (36 fl. oz.)

B. Consumable Materials

- (1) D00071 Lubricating Oil, MIL-PRF-7808 (optional to MIL-PRF-23699)
(2) D00068 Lubricating Oil, MIL-PRF-23699 (optional to MIL-PRF-7808)

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
(3) AMM 29-11-31/401, Air Driven Pump (ADP) Oil Filter and Screen

D. Access

- (1) Location Zone
195 Wing-to-Body - Aft Lower Half (Left)
(2) Access Panel
195SL Air Driven Pump

E. Procedure

S 863-002

- (1) Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
(a) 11D31, HYDRAULIC AIR PUMP

S 013-003

- (2) Open the access panel, 195SL, for the air driven pump (AMM 06-41-00/201).

S 033-004

- (3) Remove the dipstick from the fill port.

S 033-005

- (4) Remove the drain plug from the gearbox.

EFFECTIVITY

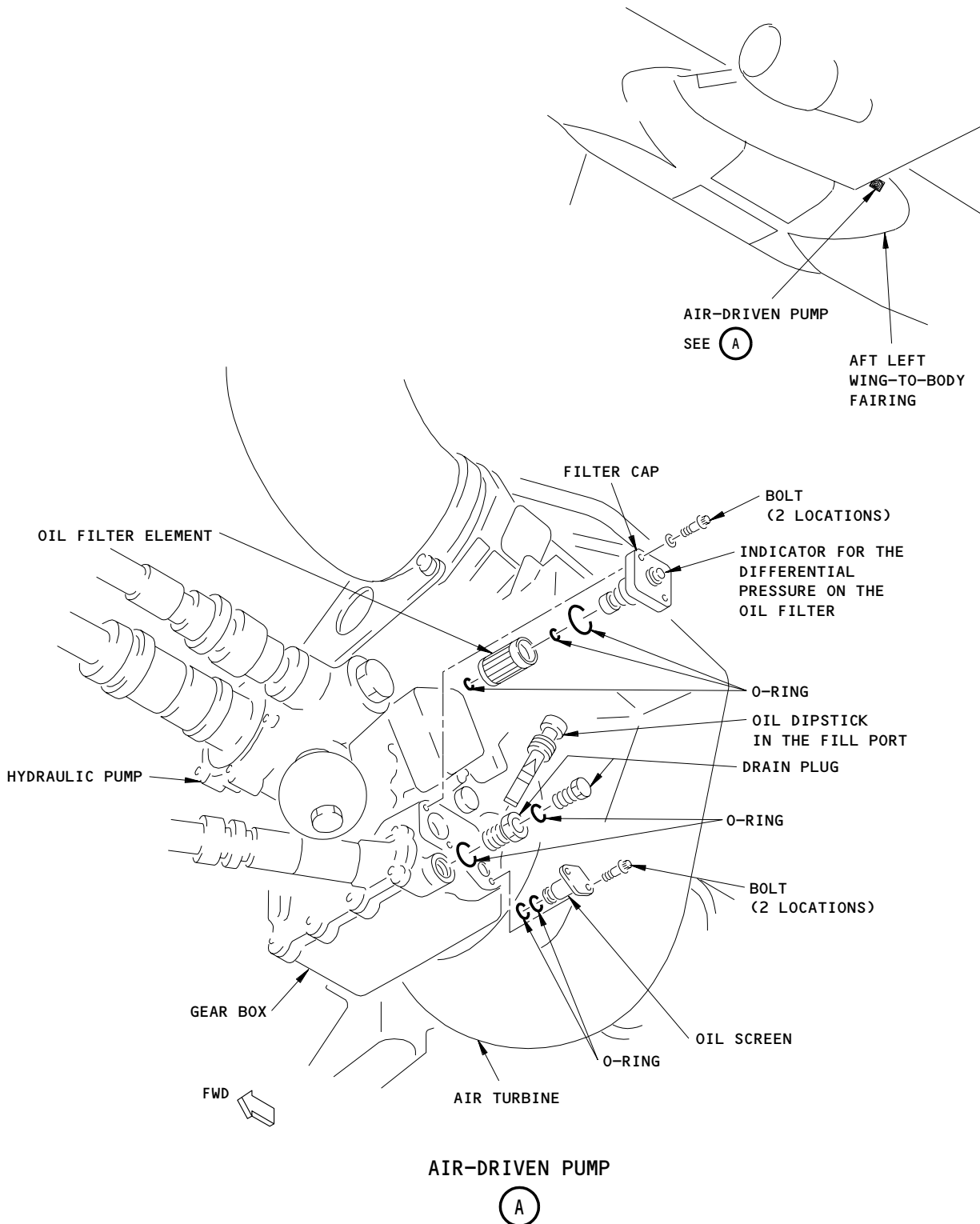
ALL

12-22-04

01

Page 301
Apr 22/04

BOEING
767
MAINTENANCE MANUAL



AIR-DRIVEN PUMP
(A)

Air-Driven Pump
Figure 301

EFFECTIVITY	
	ALL

12-22-04

01

Page 302
Aug 22/05

- S 683-006
(5) Drain all of the oil from the gearbox.
- S 213-007
(6) Make sure you can not see the button on the differential pressure indicator, on the oil filter.
- S 163-008
(7) If you can see the button, replace the oil filter element and clean the oil screen (AMM 29-11-31)
- S 643-009
(8) Lubricate the new O-ring with oil from the gearbox.
- S 433-010
(9) Install the new O-ring on the drain plug.
- S 433-011
(10) Install and tighten the drain plug in the gearbox to 120-130 pound-inches (13.6-14.7 N.m.).
- S 613-022
(11) Add oil through the fill port until the oil is at the correct level on the dipstick.
- S 433-013
(12) Install the dipstick in the fill port of the gearbox.
- S 163-014
(13) Remove the unwanted oil, on the gearbox, with a rag.
- S 863-015
(14) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11D31, HYDRAULIC AIR PUMP
- S 863-016
(15) Operate the air driven pump (AMM 29-11-00/201).
- S 793-017
(16) Make sure there are no leaks at the gearbox on the air driven pump.
- S 863-018
(17) Stop the air driven pump (AMM 29-11-00/201).

EFFECTIVITY

ALL

12-22-04

02

Page 303
Apr 22/08

 **BOEING**
767
MAINTENANCE MANUAL

- S 413-019
(18) Close the access panel, 195SL, for the air driven pump
(AMM 06-41-00/201).

EFFECTIVITY

ALL

12-22-04

02

Page 304
Dec 10/98

AIRPLANE – SERVICING (FILTER IDENTIFICATION)

TASK 12-23-00-603-001

1. Filter Servicing

A. General

(1) The tables that follow show the filters, in each airplane system, that must have regular maintenance. The procedures to clean or replace the filters or filter elements are given in the last column.

(a) Air Conditioning

AIR CONDITIONING		
NAME	ELEMENT TYPE	CHAPTER
Conditioned Air Return Grilles	Cleanable	21-23-05
Recirculation Air Filter	Replaceable	21-25-02
Aft Equip/ Lav/Galley Vent Fan Screen	Cleanable	21-26-01
Galley Ventilation Filter	Replaceable	21-26-03
Bulk Cargo Vent Fan Inlet Screen	Cleanable	21-26-06
Positive Pressure Relief Valve Filter	Replaceable	21-32-02
E/E Bay Conical Air Screen	Cleanable	21-58-22

EFFECTIVITY

ALL

12-23-00

02

Page 301
Dec 22/05

AIR CONDITIONING		
NAME	ELEMENT TYPE	CHAPTER
Equipment Cooling Air Cleaner	Cleanable	21-58-30
Zone Temperature Sensor Filter	Replaceable	21-61-09

(b) Autoflight

AUTOFLIGHT		
NAME	ELEMENT TYPE	CHAPTER
Elevator Autopilot Servo Filter	Replaceable	22-12-04
Directional Autopilot Servo Filter	Replaceable	22-13-05
Yaw Damper Servo Filter	Replaceable	22-21-02

EFFECTIVITY

ALL

12-23-00

02

Page 302
Apr 22/06

(c) Electrical Power

ELECTRICAL POWER		
NAME	ELEMENT TYPE	CHAPTER
IDG Scavenge Filter	Replaceable	24-11-02

(d) Flight Controls

FLIGHT CONTROLS		
NAME	ELEMENT TYPE	CHAPTER
LCCA Filter	Replaceable	27-11-15
Inboard Aileron PCA Filter	Replaceable	27-11-48
Outboard Aileron PCA Filter	Replaceable	27-11-49
Rudder PCA Filter	Replaceable	27-21-02
Rudder Ratio Changer Actuator Filter	Replaceable	27-21-15
Spoiler PCA Filter	Replaceable	27-61-02

EFFECTIVITY

ALL

12-23-00

03

Page 303
Apr 22/06

(e) Fuel

FUEL		
NAME	ELEMENT TYPE	CHAPTER
Fuel Inlet Screen Assembly	Cleanable	28-22-04
Sump Water Removal Screen Assembly	Cleanable	28-22-06
Motive Flow Screen	Cleanable	28-22-08

(f) Hydraulic Power

HYDRAULIC POWER		
NAME	ELEMENT TYPE	CHAPTER
System L & R Return Filter	Replaceable	29-11-15
System C Return Filter	Replaceable	29-11-16
EDP Pressure Filter	Replaceable	29-11-17
EDP Case Drain Filter	Replaceable	29-11-17
ACMP Pressure Filter	Replaceable	29-11-18
ACMP Case Drain Filter	Replaceable	29-11-18
ADP Pressure Filter	Replaceable	29-11-19
ADP Case Drain Filter	Replaceable	29-11-19

EFFECTIVITY

ALL

12-23-00

02

Page 304
Apr 22/06

HYDRAULIC POWER		
NAME	ELEMENT TYPE	CHAPTER
System L & R Reservoir Pressurization Air Filter	Cleanable	29-11-25
System C Reservoir Pressurization Air Filter	Cleanable	29-11-26
ADP Oil Filter	Replaceable	29-11-31
ADP Oil Screen	Cleanable	29-11-31
Reservoir Fill Filter	Replaceable	29-18-03
RAT Pressure Filter	Cleanable	29-21-11
RAT Case Drain Filter	Cleanable	29-21-11

EFFECTIVITY

ALL

12-23-00

02

Page 305
Apr 22/06

(g) Indication/Recording Systems

INDICATION/RECORDING SYSTEMS		
NAME	ELEMENT TYPE	CHAPTER
Digital Flight Data Acquisition Unit (DFDAU) Cooling Air Inlet Screen	Cleanable	31-31-03
Data Multiplexer (DMU) Cooling Air Inlet Screen	Cleanable	31-35-08
EICAS Video Display Cooling Air Inlet Screen	Cleanable	31-41-01

(h) Landing Gear

LANDING GEAR		
NAME	ELEMENT TYPE	CHAPTER
Brake Metering Valve Inlet Filter	Cleanable	32-41-02
Normal Antiskid Module Inlet Filter	Cleanable	32-42-03
Normal Antiskid Module Screen Filter	Cleanable	32-42-03
Alternate Antiskid Module Screen Filter	Cleanable	32-42-03
Alternate Antiskid Module Inlet Filter	Cleanable	32-42-03
Antiskid Shuttle Valve Filter	Cleanable	32-42-07

EFFECTIVITY

ALL

12-23-00

LANDING GEAR		
NAME	ELEMENT TYPE	CHAPTER
Autobrake Valve Module Filter	Replaceable	32-42-09
Nose Wheel Steering Metering Valve Module Filter Screen	Cleanable	32-51-04

EFFECTIVITY

ALL

12-23-00

05

Page 307
Apr 22/06

(i) Navigation

NAVIGATION		
NAME	ELEMENT TYPE	CHAPTER
L & R Air Data Computer Cooling Air Inlet Screen	Cleanable	34-12-01
Altitude Alert Cooling Air Inlet Screen	Cleanable	34-16-01
L, R & C Inertial Reference Unit Cooling Air Inlet Screen	Cleanable	34-21-01
L, R & C Electronic Flight Instrument System Sum Generator Cooling Air Inlet Screen	Cleanable	34-22-01
Electronic Attitude Director Indicator Cooling Air Inlet Screen	Cleanable	34-22-03
Electronic Horizontal Situation Indicator Cooling Air Inlet Screen	Cleanable	34-22-04
L, R & C Instrument Landing System Cooling Air Inlet Screen	Cleanable	34-31-01
L, R & C Radio Altimeter Cooling Air Inlet Screen	Cleanable	34-33-01
Weather Radar Transceiver Mount Filter Cooling Air Inlet Screen	Replaceable	34-43-01

EFFECTIVITY

ALL

12-23-00

04

Page 308
Apr 22/06

NAVIGATION		
NAME	ELEMENT TYPE	CHAPTER
Ground Proximity Warning Computer Cooling Air Inlet Screen	Cleanable	34-46-01
L & R Voice Omni Range/Marker Receiver Cooling Air Inlet Screen	Cleanable	34-51-01
Air Traffic Control Cooling Air Inlet Screen	Cleanable	34-53-01
L & R Distance Measuring Equipment Interrogator Cooling Air Inlet Screen	Cleanable	34-55-01
L Automatic Direction Finder Cooling Air Inlet Screen	Cleanable	34-57-01
R Automatic Direction Finder Cooling Air Inlet Screen	Cleanable	34-57-01

EFFECTIVITY

ALL

12-23-00

06

Page 309
Apr 22/06

(j) Pneumatic

PNEUMATIC		
NAME	ELEMENT TYPE	CHAPTER
High Pressure Controller Filter Element	Cleanable	36-11-08
Pressure Regulating Shutoff Valve Filter Element	Cleanable	36-11-09
Fan Air Modulating Valve Filter Element	Cleanable	36-11-16
Fan Air Temperature Sensor Filter Element	Cleanable	36-11-17
Pressure Regulating Valve Controller Filter Element	Cleanable	36-11-19

EFFECTIVITY

ALL

12-23-00

04

Page 310
Apr 22/06

(k) Water/Waste

WATER/WASTE		
NAME	ELEMENT TYPE	CHAPTER
Potable Water Filter	Replaceable	38-10-00
Compressor Inlet Air Filter	Replaceable	38-15-02
Compressor Air Filter	Replaceable	38-15-02
Water Separator	Replaceable	38-32-02
Vacuum Blower Inlet Air Filter	Replaceable	38-32-06
Rinse Line Filter	Replaceable	38-32-18

(l) Airborne Auxiliary Power

AIRBORNE AUXILIARY POWER		
NAME	ELEMENT TYPE	CHAPTER
APU Oil Pressure Filter Element	Replaceable	49-27-03
Generator Scavenge Filter Element	Replaceable	49-27-03
APU Fuel Filter Element	Replaceable	49-31-04
Fuel High Pressure Filter	Cleanable	49-31-07
Fuel Flow Divider Filter Element	Cleanable	49-31-08
APU Surge Valve Filter Element	Cleanable	49-53-06

EFFECTIVITY

ALL

12-23-00

08

Page 311
Apr 22/06

(m) Engine

ENGINE		
NAME	ELEMENT TYPE	CHAPTER
Main Oil Filter/ Element	Replaceable	72-61-11

EFFECTIVITY

ALL

12-23-00

11

Page 312
Apr 22/06

(n) Engine Fuel and Control

ENGINE FUEL AND CONTROL		
NAME	ELEMENT TYPE	CHAPTER
Fuel Pump Filter	Replaceable	73-11-02
Fuel Distribution Valve Strainer	Cleanable	73-11-04
Last Chance Oil Strainers 1. Main and Angle Gearbox 2. No. 1, 1.5, 2 Bearing 3. No. 3 Bearing 4. No. 4 Bearing	Cleanable	79-21-16

EFFECTIVITY

ALL

12-23-00

(o) Starting

STARTING		
NAME	ELEMENT TYPE	CHAPTER
Starter Control Valve Filter	Cleanable	80-11-04

EFFECTIVITY

ALL

12-23-00

02

Page 314
Apr 22/06

CLEANING AND POLISHING—SERVICING

1. General

- A. Use this procedure to clean and polish the external surfaces of the airplane. Clean the external surfaces frequently to help prevent corrosion and to extend the life of the airplane structure. Clean the surfaces that do not have paint more frequently than the painted surfaces.
- B. The liquids used in this procedure can cause injury to the skin and eyes, or damage to the airplane. Always wear clothing that will prevent injury when you clean the airplane. The cleaners can cause corrosion if they are not removed completely from the airplane surfaces. The solvent that is mixed with the cleaners is flammable. Keep the solvent away from sources of heat.
- C. Failure to remove covers from pitot probes or coverings from static ports before flight may cause large errors in airspeed-sensing and altitude-sensing signals, which may lead to loss of safe flight.

TASK 12-25-01-103-001

2. Clean the External Surfaces of the Airplane

A. General

NOTE: Boeing considers water pressure above 80 psi to be "high pressure".

- (1) This section includes these procedures:
 - (a) Remove Light Material (dust and dirt) from Smooth Surfaces
 - (b) Remove Moderately Heavy Material (oil and mud) from Smooth Surfaces
 - (c) Remove Heavy Material (grease and exhaust particles) from Smooth Surfaces
 - (d) Remove Material Around Sensitive Components
 - (e) Remove Unwanted Hydraulic Fluid
 - (f) Clean With Foam
- (2) Use the Remove Material Around Sensitive Components procedure to clean the areas that contain mechanical, electrical, or hydraulic components. These areas include the wheel wells, flight control surfaces, and landing gear.
- (3) When moderately heavy or heavy material removal is necessary, remove the heavier material first. Then clean the airplane with the procedure for light material removal.
- (4) To clean large areas, use non-atomizing spray equipment, swabs, and brushes. To clean small areas, use rags, brushes, and sponges. Do not clean an area so large that the cleaner dries on the surface before you can flush it with water.

EFFECTIVITY

ALL

12-25-01

02

Page 301
Aug 22/07

- (5) To clean the windows in the flight compartment, refer to AMM 12-16-02/301, Flight Compartment Windows.
- (6) To clean the windows in the passenger compartment, refer to AMM 12-16-03/301, Passenger Compartment Windows.

B. Equipment

- (1) Pitot-Static Probe Protective Covers - KPC3-825-8
- (2) Pitot Probe Cover Removal/Installation Pole - A10002-1
- (3) Angle of Attack Sensor - R/C-A0AC-2 (Sesame Technologies)
- (4) Landing Gear Door Locks (AMM 32-00-15/201).
- (5) Spray Equipment - Ted Trump Co., Highway 98 East, Elberta, Alabama
- (6) Source of compressed air - commercially available
- (7) Mops - commercially available
- (8) Boots - commercially available
- (9) Gloves - commercially available
- (10) Face mask or goggles - commercially available
- (11) Apron - commercially available

C. Consumable Materials

- (1) B00090 Degreasing Fluid - MIL-T-81533A
- (2) B00261 Cleaner - Oakite 74L (foam cleaning)
- (3) G00215 Soft bristle fiber brush
- (4) B00192 Cleaning Solvent - BMS 3-2, Type I
- (5) B00316 Solvent - Aliphatic Naphtha, TT-N-95, Type I
- (6) G02443 Orange barricade tape, 3 inches wide, 4 mils thick, non-adhesive, with "REMOVE BEFORE FLIGHT" printed on it in black letters
- (7) G02219 3M Scotch Brand No. 471 vinyl adhesive tape (1.5 inches wide) bright yellow color.
- (8) G02444 Red paper tag (3 inches wide, 6 inches long) with attaching wire that has "STATIC PORTS COVERED" printed on it in black letters - P/N 2000S, or equivalent.
- (9) G02447 Red paper tag (3 inches wide, 6 inches long) with attaching wire that has "PITOT PROBES COVERED" printed on it in black letters - P/N 1000P, or equivalent.
- (10) G00252 Black polyethylene sheet, 6 mils thick
- (11) Table 301: Water-Base Alkaline Cleaners
- (12) Table 302: Solvent Emulsion Cleaners
- (13) Table 303: Heavy Duty Cleaners

EFFECTIVITY

ALL

12-25-01

01

Page 302
Apr 22/08

Table 301: Water-Base Alkaline Cleaners

		DILUTION RATIO: NUMBER OF VOLUMES OF WATER PER ONE VOLUME OF CLEANER		
SAS	CLEANER OR MATERIALS SATISFYING AMS 1527	LIGHTLY DIRTY	MODERATELY DIRTY	VERY DIRTY
SAS	B00017 PACIFIC CHEMICAL B-82	7	3	2
	B00004 KELITE 28	10	4	2
	B00005 CEEBEE 280	10	4	2
	B00008 OAKITE 204	10	4	2
	B00016 TEC NO. 1	10	4	2
	B00018 METACLEAN AC	10	4	2
	B00013 DUBOIS C-1102	10	4	3
	B00014 CALLA 301	10	4	3
	B00010 PENNSALT 2271R	10	3	2
SAS	B00012 TURCO JET CLEAN C AVIAWASH 5000	20	5	3

Table 302: Solvent Emulsion Cleaners

DILUTION RATIO: NUMBER OF VOLUMES OF WATER AND CLEANING SOLVENT PER ONE VOLUME OF CLEANER		
CLEANER	WATER	CLEANING SOLVENT
ANY CLEANER IN TABLE 301	2	5 TO 6

EFFECTIVITY

ALL

12-25-01

SAS

Page 303
May 10/96

Table 303: Heavy Duty Cleaners

Table 303: Heavy Duty Cleaners		
	DILUTION RATIO: NUMBER OF VOLUMES OF WATER OR CLEANING SOLVENT TO ONE VOLUME OF CLEANER	
CLEANERS OR MATERIALS SATISFYING AMS 1533	WATER	CLEANING SOLVENT
B00022 AIRSHOW W	5 TO 15	
B00023 NAVEE 427	3 TO 5	
B00024 GREASE SOLVE		6 TO 12

SAS
SAS

D. References

- (1) AMM 20-41-00/201, Static Grounding
- (2) AMM 24-22-00/201, Control (Supply Power)
- (3) AMM 32-00-15/201, Landing Gear Door Locks
- (4) AMM 71-00-03/201, Power Plant (Preservation and Depreservation)

E. Prepare to Clean the Airplane

NOTE: Be careful when you clean the airplane in very hot weather. The heated surface of the airplane can dry the cleaners before you can flush them with water. The dried cleaners can stain the surface.

S 503-002

WARNING: KEEP ALL OF THE EQUIPMENT THAT YOU USE WITH FLAMMABLE SOLVENTS AWAY FROM SOURCES OF HEAT. IF THERE IS WIND, MAKE SURE THE SOLVENTS DO NOT FALL ON ELECTRICAL EQUIPMENT OR WARM COMPONENTS.

- (1) Move all of the equipment that you will use with flammable solvents away from sources of heat.

S 863-003

- (2) Statically ground the airplane (AMM 20-41-00/201).

EFFECTIVITY

ALL

12-25-01

SAS

Page 304
Aug 22/08

S 863-045
(3) Remove electrical power (AMM 24-22-00/201).

S 843-004
(4) Close all of the passenger doors, cargos doors, emergency exits, and access doors and panels.

NOTE: If the doors cannot be closed because of other servicing, be careful that no fluid gets into the cabin area.

S 843-028

WARNING: WHEN THE PITOT PROBES ARE COVERED, MAKE SURE THAT CONDITION IS VISIBLE FROM THE GROUND. IN ADDITION, ATTACH A TAG TO THE LEFT CONTROL WHEEL IN THE FLIGHT DECK AS A REMINDER THAT PITOT PROBES ARE COVERED. FAILURE TO OBSERVE AND REMOVE COVERINGS OVER PITOT PROBES BEFORE FLIGHT MAY CAUSE LARGE ERRORS IN AIRSPEED-SENSING AND ALTITUDE-SENSING SIGNALS, WHICH MAY LEAD TO LOSS OF SAFE FLIGHT.

CAUTION: USE COVERS, BLACK POLYETHYLENE SHEET, AND YELLOW VINYL ADHESIVE TAPE TO KEEP LIQUIDS OUT OF AREAS THAT CONTAIN MECHANICAL, ELECTRICAL, OR HYDRAULIC COMPONENTS. LIQUIDS THAT GET INTO THESE AREAS CAN CAUSE CORROSION, FREEZE DURING AIRPLANE FLIGHT, OR REMOVE NECESSARY LUBRICANTS.

CAUTION: WHENEVER AN OPENING IS COVERED, MAKE SURE THAT CONDITION IS VISIBLE FROM THE GROUND. ENGINES SHOULD NOT BE OPERATED WITH COVERS IN PLACE BECAUSE THE COVERS CAN COME OFF AND DAMAGE THE ENGINES.

CAUTION: MAKE SURE THE PITOT-STATIC PROBE COVERS ARE IN GOOD WORKING CONDITION WITH NO EVIDENCE OF DAMAGE, ESPECIALLY FRAYING AROUND THE COVER OPENING. FRAYED FIBERS FROM THE COVER COMBINED WITH OTHER SUBSTANCES SUCH AS DIRT, GREASE AND FLUIDS CAN CAUSE OBSTRUCTION IN THE PROBE.

- (5) Put the covers on these components:
- (a) Pitot static probes (See Fig. 301 for locations of pitot static probes)
 - (b) Angle of Attack Sensor
 - (c) Engine inlet, fan exhaust, and turbine exhaust (AMM 71-00-03/201).
 - (d) Brakes
 - (e) Tires

EFFECTIVITY

ALL

12-25-01

02

Page 305
Aug 22/08

S 843-029

- (6) Attach a red paper tag that has "PITOT PROBES COVERED" printed on it in black letters, to the top of the left control wheel in the flight deck with wire.

S 843-030

CAUTION: WHENEVER AN OPENING IS COVERED, MAKE SURE THAT CONDITION IS VISIBLE FROM THE GROUND. ENGINES SHOULD NOT BE OPERATED WITH COVERS IN PLACE BECAUSE THE COVERS CAN COME OFF AND DAMAGE THE ENGINES.

CAUTION: DO NOT UNDER ANY CIRCUMSTANCES SPRAY DETERGENT OR WATER DIRECTLY INTO OR AT ANY OF THE OPENINGS LISTED BELOW OR DAMAGE TO THE AIRPLANE AND ENGINES COULD RESULT.

- (7) Use yellow vinyl adhesive tape and black polyethylene sheet to cover the following openings, but do not seal them air-tight:
- (a) Surge tank and fuel tank vents
 - (b) APU exhaust duct outlet port
 - (c) APU oil cooling air exhaust port
 - (d) Equipment Cooling Ground Supply Valve Port
 - (e) Overboard exhaust valve port
 - (f) Smoke Clearance Valve Port
 - (g) Ram air inlet and outlet doors
 - (h) Outflow valves
 - (i) Doors
 - (j) Forward cargo exhaust ports

EFFECTIVITY

ALL

12-25-01

05

Page 306
Aug 22/08

S 843-031

WARNING: WHEN THE STATIC PORTS ARE COVERED, MAKE SURE THAT CONDITION IS VISIBLE FROM THE GROUND. IN ADDITION, ATTACH A TAG TO THE LEFT CONTROL WHEEL IN THE FLIGHT DECK AS A REMINDER THAT STATIC PORTS ARE COVERED. FAILURE TO OBSERVE AND REMOVE COVERINGS OVER STATIC PORTS BEFORE FLIGHT MAY CAUSE LARGE ERRORS IN AIRSPEED-SENSING AND ALTITUDE-SENSING SIGNALS, WHICH MAY LEAD TO LOSS OF SAFE FLIGHT.

CAUTION: WHENEVER AN OPENING IS COVERED, MAKE SURE THAT CONDITION IS VISIBLE FROM THE GROUND. ENGINES SHOULD NOT BE OPERATED WITH COVERS IN PLACE BECAUSE THE COVERS CAN COME OFF AND DAMAGE THE ENGINES.

CAUTION: DO NOT UNDER ANY CIRCUMSTANCES SPRAY DETERGENT OR WATER DIRECTLY INTO OR AT THE STATIC PORTS OR DAMAGE TO THE STATIC PORTS COULD RESULT.

- (8) Use yellow vinyl adhesive tape and orange barricade tape that has "REMOVE BEFORE FLIGHT" printed on it in black letters to cover the static ports in the following manner (see Fig. 301 for locations of static ports. See Fig. 302 for illustrations of the static port cover procedure).

WARNING: DO NOT PLACE YELLOW VINYL ADHESIVE TAPE OVER THE HOLES OF THE STATIC PORTS.

- (a) Clean the area around each static port with aliphatic naphtha or equivalent, and a clean dry rag where you will put the yellow vinyl adhesive tape (see Fig. 302).
- (b) Put one end of approximately a 4-foot piece of the orange barricade tape over the holes of the static port and secure the upper edge with 5 inches of No. 471 yellow vinyl adhesive tape (see Fig. 302 steps 1 and 2).
- (c) Put a 5-inch piece of vinyl adhesive tape on each vertical edge of the barricade tape overlapping the first strip of adhesive tape (see Fig. 302 step 3).
- (d) Put an 8-inch piece of vinyl adhesive tape horizontally over the barricade tape below the static port holes, overlapping the two vertical strips of adhesive tape (see Fig. 302 step 4).
- (e) The barricade tape should be allowed to stream down so it is visible from the ground.

S 843-032

- (9) Attach a red paper tag that has "STATIC PORTS COVERED" printed on it in black letters, to the top of the left control wheel in the flight deck with wire.

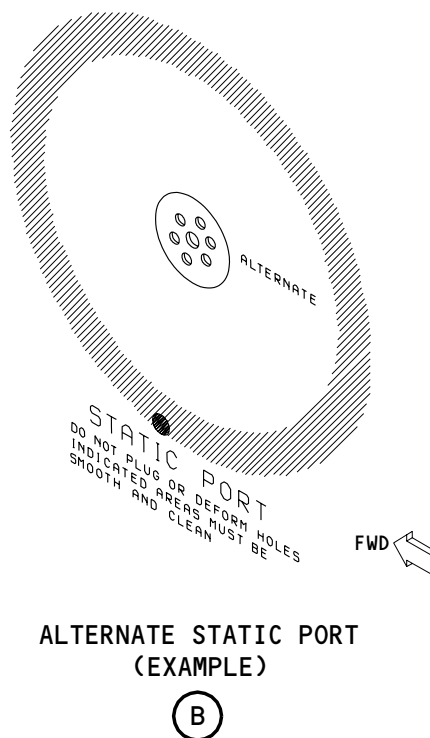
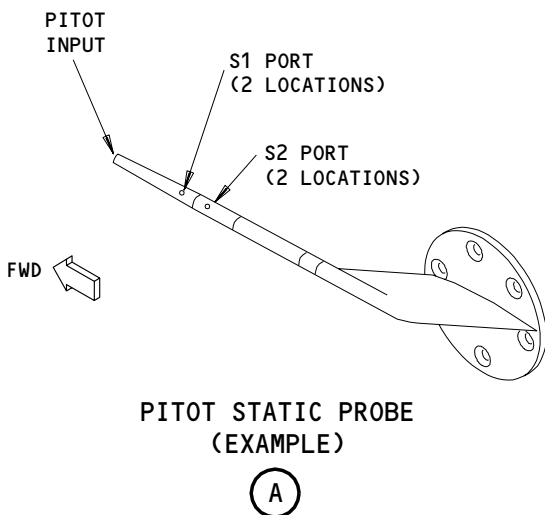
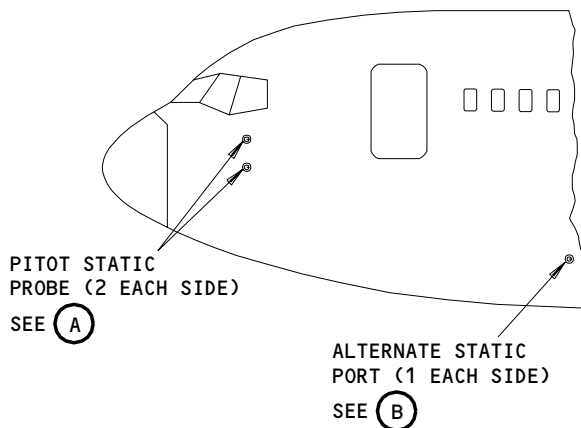
EFFECTIVITY

ALL

12-25-01

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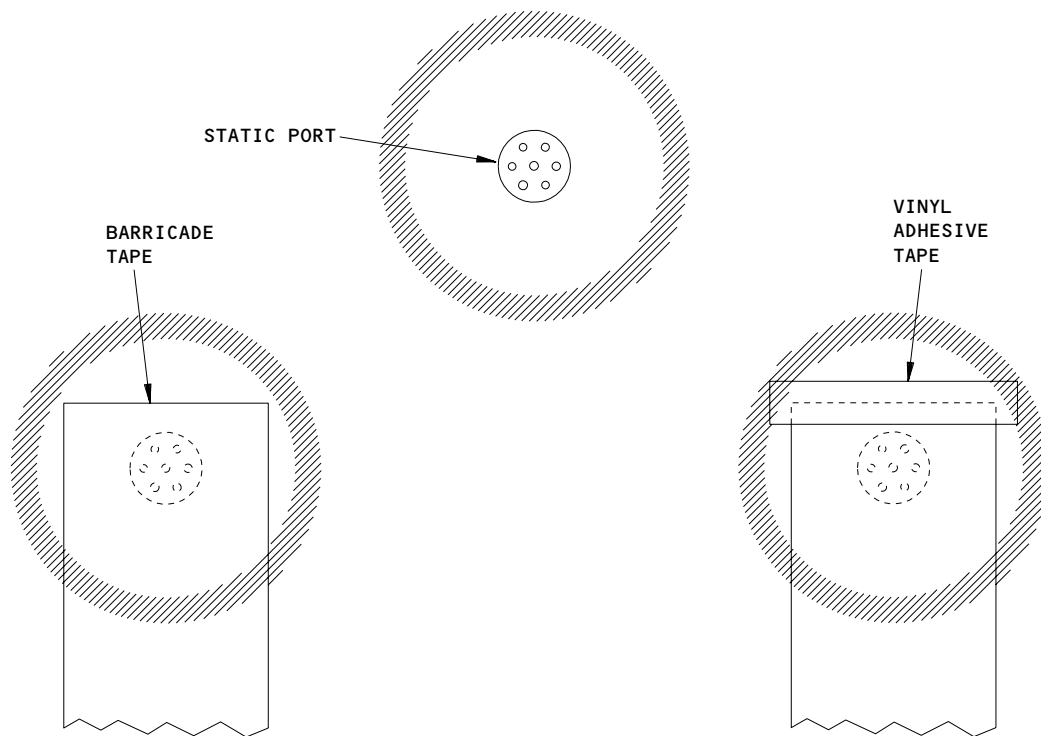
Page 307
Aug 22/08



Pitot-Static System - Component Location
Figure 301

EFFECTIVITY	ALL
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12-25-01

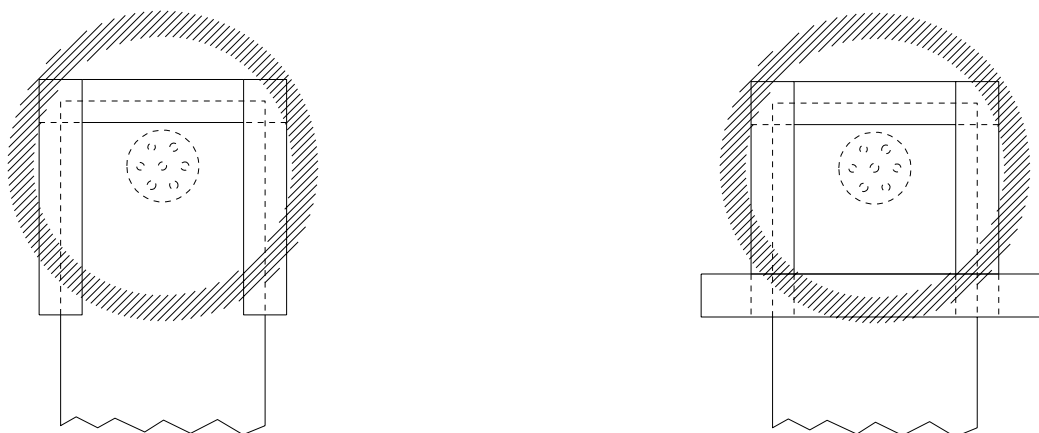


STEP 1

PUT ONE END OF THE BARRICADE TAPE OVER THE STATIC PORT TO COVER THE HOLES

STEP 2

SECURE THE TOP EDGE OF THE BARRICADE TAPE WITH 5 INCHES OF VINYL ADHESIVE TAPE



STEP 3

PUT TWO 5-INCH STRIPS OF VINYL ADHESIVE TAPE OVER THE SIDES OF THE BARRICADE TAPE OVERLAPPING THE TOP STRIP OF ADHESIVE TAPE

STEP 4

PUT AN 8-INCH HORIZONTAL STRIP OF VINYL ADHESIVE TAPE OVER THE BARRICADE TAPE BELOW THE STATIC PORT HOLES OVERLAPPING THE TWO VERTICAL STRIPS

Static Port Cover Procedure
Figure 302

EFFECTIVITY

ALL

12-25-01

01

Page 309
Aug 22/05

652231

S 843-023

WARNING: WEAR CLOTHING AND EQUIPMENT THAT WILL PREVENT INJURY WHEN YOU CLEAN THE AIRPLANE. THE LIQUIDS USED IN THIS PROCEDURE CAN CAUSE INJURY TO SKIN AND EYES. WET AIRPLANE SURFACES ARE DANGEROUS WHEN YOU WALK ON THEM.

- (10) Wear gloves and goggles to prevent injury to your skin and eyes. Wear a safety harness when you walk on wet surfaces above the ground.

S 843-008

- (11) Do not let the tires stay in the liquid that was used to clean the airplane.

NOTE: The tires can be left in the cleaning liquid while the plane is being washed, and then rolled away to a clean area.

S 843-021

CAUTION: MAKE SURE MIXTURE OR WATER DOES NOT GET IN THE STEEL OR CARBON BRAKE HEAT SINKS. CONTAMINATION CAN CAUSE DAMAGE TO CARBON BRAKES AND REDUCE BRAKE PERFORMANCE FOR CARBON AND STEEL BRAKES.

- (12) Make sure the brakes are properly covered.

S 843-009

CAUTION: DO NOT USE A CLEANER IF IT IS IN A STRATIFIED (NOT MIXED) CONDITION. A CLEANER THAT IS STRATIFIED CAN STAIN OR CAUSE CORROSION TO AIRPLANE SURFACES.

- (13) Examine the cleaner before you use it. If the cleaner does not look mixed, then mix it again. Examine the cleaner again after one hour. Discard the cleaner if it does not stay in a mixed condition.

F. Clean the Airplane

S 113-010

- (1) Remove Light Material (dust and dirt) from Smooth Surfaces
(a) Move the flaps to the fully retracted position.

NOTE: To clean the flaps in the extended position, refer to the Remove Material Around Sensitive Components procedure.

EFFECTIVITY

ALL

12-25-01

05

Page 310
Aug 22/08

CAUTION: DO NOT USE THE CLEANERS IN HIGHER CONCENTRATIONS THAN SHOWN IN TABLE 301. HIGHER CONCENTRATIONS CAN CAUSE DAMAGE TO ACRYLIC WINDOWS, STAINS ON PAINTED SURFACES, AND CORROSION ON METALS.

- (b) Mix the water-base alkaline cleaner from Table 301 for the condition of the surface that you will clean.

WARNING: DO NOT USE HIGH PRESSURE SPRAY EQUIPMENT TO CLEAN MECHANICAL, ELECTRICAL, OR HYDRAULIC COMPONENTS. LIQUIDS THAT GET INTO THESE AREAS CAN CAUSE CORROSION, FREEZE DURING FLIGHT OR REMOVE NECESSARY LUBRICANTS.

CAUTION: KEEP THE NOZZLE OF SPRAY EQUIPMENT MORE THAN 12 INCHES AWAY FROM THE SURFACE OF THE AIRPLANE. THE SPRAY CAN CAUSE DAMAGE TO THE SURFACE.

- (c) Apply water to the area that you will clean.
- (d) Apply the cleaner to the applicable area with non-atomizing spray equipment, swabs, or brushes.

NOTE: To prevent scratches on the surface, soak the brushes in the cleaner before you use them.

- (e) Let the cleaner soak for approximately five minutes. Apply the cleaner again if necessary to keep the surface wet.
- (f) Rub the surface with a brush to help remove unwanted material.

CAUTION: MAKE SURE YOU FLUSH THE SURFACE SUFFICIENTLY TO REMOVE ALL OF THE CLEANER. THE CLEANER CAN CAUSE CORROSION IF IT IS NOT REMOVED COMPLETELY FROM THE AIRPLANE SURFACE.

- (g) Flush the surface with clean, warm water (160°F maximum).
- (h) Dry the wet surface with air or towels.

S 113-011

- (2) Remove Moderately Heavy Material (oil and mud) from Smooth Surfaces
 - (a) Move the flaps to the fully retracted position.

NOTE: To clean the flaps in the extended position, refer to the Remove Material Around Sensitive Components procedure.

WARNING: KEEP THE CLEANING SOLVENT THAT IS USED IN THE SOLVENT EMULSION CLEANERS AWAY FROM SOURCES OF HEAT. THE CLEANING SOLVENT IS FLAMMABLE.

- (b) Mix the solvent emulsion cleaner from Table 302.

EFFECTIVITY

ALL

12-25-01

04

Page 311
Aug 22/08

 **BOEING**
767
MAINTENANCE MANUAL

(c) Mix the cleaner until it is thick and creamy.

WARNING: DO NOT USE HIGH-PRESSURE SPRAY EQUIPMENT TO CLEAN MECHANICAL, ELECTRICAL, OR HYDRAULIC COMPONENTS. LIQUIDS THAT GET INTO THESE AREAS CAN CAUSE CORROSION, FREEZE DURING AIRPLANE FLIGHT, OR REMOVE NECESSARY LUBRICANTS.

CAUTION: KEEP THE NOZZLE OF THE SPRAY EQUIPMENT MORE THAN 12 INCHES AWAY FROM THE SURFACE OF THE AIRPLANE. THE SPRAY CAN CAUSE DAMAGE TO THE SURFACE.

CAUTION: DO NOT LET THE SOLVENT EMULSION CLEANER TOUCH ACRYLIC WINDOWS OR RUBBER PARTS. THE SOLVENT EMULSION CLEANER WILL CAUSE DAMAGE TO ITEMS THAT CONTAIN ACRYLIC OR RUBBER.

- (d) Apply a heavy layer of cleaner to the applicable area with non-atomizing spray equipment, mops, or brushes.
- (e) Let the cleaner soak for five to ten minutes. Do not let the cleaner dry on the surface.
- (f) Rub the surface with a brush to help remove unwanted material.

CAUTION: MAKE SURE YOU FLUSH THE SURFACE SUFFICIENTLY TO REMOVE ALL OF THE CLEANER. THE CLEANER CAN CAUSE CORROSION IF IT IS NOT REMOVED COMPLETELY FROM THE AIRPLANE SURFACE.

- (g) Flush the surface with clean, warm water (160°F maximum).
- (h) Dry the wet surfaces with air or towels.

S 113-012

(3) Remove Heavy Material (grease and exhaust particles) from Smooth Surfaces

- (a) Use the procedure to Remove Moderately Heavy Material (oil and mud) from Smooth Surfaces with these changes:
 - 1) Use a heavy duty cleaner from Table 303.
 - 2) Let the cleaner soak for 15 minutes maximum.

CAUTION: USE CEEBEE MAJORCLEAN WITH CARE. THE ABRASIVES IN THIS CLEANER CAN REMOVE THE LUSTER ON CLAD ALUMINUM. THE CLEANER CAN ALSO DECREASE THE CORROSION RESISTANCE OF ANODIZED ALUMINUM.

- 3) For stains that are not removed by the cleaners in Table 303, use Ceebee Majorclean.

S 113-013

(4) Remove Material Around Sensitive Components

EFFECTIVITY

ALL

12-25-01

04

Page 312
Aug 22/08

WARNING: REFER TO AMM 32-00-15/201 TO INSTALL THE DOOR LOCKS FOR THE LANDING GEAR. THE DOORS CAN FALL AND CAUSE INJURY OR DAMAGE IF THE LOCKS ARE NOT INSTALLED CORRECTLY.

- (a) Open the landing gear doors, and install the door locks (AMM 32-00-15/201).
- (b) If you will clean the flaps, extend them to the fully down position.
- (c) Mix the water-base alkaline cleaner from Table 301 for the condition of the surface that you will clean. For heavy material (grease and exhaust particles), mix the heavy duty cleaner from Table 303.

WARNING: DO NOT USE HIGH-PRESSURE SPRAY EQUIPMENT. HIGH-PRESSURE SPRAY EQUIPMENT CAN PUT LIQUIDS INTO BEARINGS, JOINTS, BRAKES, ELECTRICAL CONNECTORS, AND OTHER SEALED COMPONENTS. LIQUIDS THAT GET INTO THESE AREAS CAN CAUSE CORROSION, FREEZE DURING AIRPLANE FLIGHT, OR REMOVE NECESSARY LUBRICANTS.

- (d) Apply the cleaner to the applicable area with swabs or brushes.

NOTE: To prevent scratches on the surface, soak the brushes in the cleaner before you use them.

- (e) Let the cleaner soak for approximately five minutes. Apply the cleaner again if necessary to keep the surface wet.

CAUTION: DO NOT REMOVE THE LAYER OF GREASE FROM MECHANICAL JOINTS. THIS GREASE LUBRICATES THE JOINT AND PREVENTS CORROSION.

- (f) Carefully rub the surface with a clean brush to help remove unwanted material.

CAUTION: MAKE SURE YOU FLUSH THE SURFACE SUFFICIENTLY TO REMOVE ALL OF THE CLEANER. THE CLEANER CAN CAUSE CORROSION IF IT IS NOT REMOVED FULLY FROM THE AIRPLANE SURFACE.

- (g) Flush the surface with clean, warm water (160°F maximum).
- (h) Dry the wet surface with air or towels.

CAUTION: YOU MUST LUBRICATE ALL THE BEARINGS AND JOINTS IN THE AREA YOU CLEANED. THE LUBRICANT WILL REMOVE THE UNWANTED FLUIDS WHICH COULD FREEZE, OR CAUSE CORROSION TO THE BEARING OR THE JOINT. IF YOU DO NOT LUBRICATE THE BEARINGS AND JOINTS DAMAGE TO THE COMPONENTS CAN OCCUR.

- (i) Lubricate all bearings and joints in the cleaned area (Ref Chapter 12).

EFFECTIVITY

ALL

12-25-01

02

Page 313
Aug 22/01

WARNING: REFER TO AMM 32-00-15/201 TO REMOVE THE DOOR LOCKS FOR THE LANDING GEAR. THE DOORS CAN FALL AND CAUSE INJURY OR DAMAGE IF THE LOCKS ARE NOT REMOVED CORRECTLY.

(j) Remove the door locks for the landing gear, and close the landing gear doors (AMM 32-00-15/201).

S 113-014

(5) Remove Unwanted Hydraulic Fluid

CAUTION: IF HYDRAULIC FLUID GETS ON THE CARBON BRAKES, YOU MUST REPLACE THE BRAKES. HYDRAULIC FLUID SPILLS ON TIRES CAN BE CLEANED WITH SOAPY WATER.

(a) Clean the unwanted hydraulic fluid with a mop or rags.

CAUTION: DO NOT USE WATER OR CLEANERS THAT CONTAIN FLAMMABLE SOLVENTS TO CLEAN WARM COMPONENTS.

(b) Use the MIL-T-81533A degreasing fluid to clean the hydraulic fluid from warm components.

S 113-015

(6) Clean with Foam

NOTE: Use foam when it is possible that the cleaner will stay on the surface for up to 15 minutes.

(a) Fill the tank of the foam generator. Use a liquid that contains one part of cleaner (from Table 301 or Oakite 74L) and 10 to 20 parts of water.

NOTE: If you do not have a foam generator, mix the liquid quickly to make foam.

WARNING: DO NOT USE HIGH-PRESSURE SPRAY EQUIPMENT TO CLEAN MECHANICAL, ELECTRICAL, OR HYDRAULIC COMPONENTS. LIQUIDS THAT GET INTO THESE AREAS CAN CAUSE CORROSION, FREEZE DURING AIRPLANE FLIGHT, OR REMOVE NECESSARY LUBRICANTS.

CAUTION: KEEP THE NOZZLE OF SPRAY EQUIPMENT MORE THAN 12 INCHES AWAY FROM THE SURFACE OF THE AIRPLANE. THE SPRAY CAN CAUSE DAMAGE TO THE SURFACE.

(b) Apply water to the area you will clean.

(c) Apply a heavy layer of foam cleaner.

EFFECTIVITY

ALL

12-25-01

02

Page 314
Aug 22/01

- (d) Let the cleaner soak for 5 to 15 minutes. Apply the cleaner again if necessary to keep the surface wet.
- (e) Rub the surface with a brush to help remove unwanted material.

CAUTION: MAKE SURE YOU FLUSH THE SURFACE SUFFICIENTLY TO REMOVE ALL OF THE CLEANER. THE CLEANER CAN CAUSE CORROSION IF IT IS NOT REMOVED COMPLETELY FROM THE AIRPLANE SURFACE.

- (f) Flush the surface with clean, warm water (160°F maximum).
- (g) Dry the wet surface with air or towels.

G. Put the Airplane Back In Its Usual Condition

S 843-033

WARNING: FAILURE TO REMOVE COVERS FROM PITOT PROBES BEFORE FLIGHT MAY CAUSE LARGE ERRORS IN AIRSPEED-SENSING AND ALTITUDE-SENSING SIGNALS, WHICH MAY LEAD TO LOSS OF SAFE FLIGHT.

CAUTION: REMOVE ALL COVERS. ENGINES SHOULD NOT BE OPERATED WITH COVERS IN PLACE BECAUSE THE COVERS CAN COME OFF AND DAMAGE THE ENGINES.

- (1) Remove covers from the following components:
 - (a) Pitot static probes
 - (b) Angle of Attack Sensor
 - (c) Engine inlet, fan exhaust, and turbine exhaust (AMM 71-00-03/201).
 - (d) Brakes
 - (e) Tires

S 843-034

- (2) Remove the "PITOT PROBES COVERED" tag from the left control wheel.

EFFECTIVITY

ALL

12-25-01

02

Page 315
Aug 22/01

S 843-041

WARNING: FAILURE TO REMOVE BARRICADE TAPE AND VINYL ADHESIVE TAPE FROM STATIC PORTS BEFORE FLIGHT MAY CAUSE LARGE ERRORS IN AIRSPEED-SENSING AND ALTITUDE-SENSING SIGNALS, WHICH MAY LEAD TO LOSS OF SAFE FLIGHT.

CAUTION: REMOVE ALL BARRICADE TAPE, COVERS, POLYETHYLENE SHEET AND VINYL ADHESIVE TAPE. ENGINES SHOULD NOT BE OPERATED WITH COVERS IN PLACE BECAUSE THE COVERS CAN COME OFF AND DAMAGE THE ENGINES.

- (3) Remove all barricade tape, covers, polyethylene sheet and vinyl adhesive tape from the following openings:
- (a) Static ports
 - 1) Inspect each static port and if necessary use naphtha or equivalent, and a clean dry rag to remove all tape residue, dirt and other contaminants around the static port.
 - (b) Surge tank and fuel tank vents
 - (c) APU exhaust duct outlet port
 - (d) APU oil cooling air exhaust port
 - (e) Equipment cooling ground supply valve port
 - (f) Overboard exhaust valve port
 - (g) Smoke clearance valve port
 - (h) Ram air inlet and outlet doors
 - (i) Outflow valve
 - (j) Doors

S 843-035

- (4) Remove the "STATIC PORTS COVERED" tag from the left control wheel.

TASK 12-25-01-103-016

3. Polish the External Surfaces of the Airplane

A. Equipment

- (1) Bonnet, Wool Pile - commercially available
- (2) Buffer Wheel, Cotton cloth, 80/92 thread count, Spiral sewn, 4- or 6-inch diameter, 5/8- or 7/8-inch thick, 1/4-inch diameter arbor hole - commercially available
- (3) Buffer Wheel, Hard Cloth, machine sewn, bias-type, 7 x 3 x 5/8-inch, 16 Ply - commercially available
- (4) Burnishing Tool - commercially available
- (5) Sander/Polisher, Orbital, Air-Driven - commercially available

B. Consumable Materials

- (1) C00523 Alodine 1000 - MIL-C-5541
- (2) B00047 Acid, Nitric - O-N-350
- (3) G00033 Cheesecloth - Woven, Rympcloth No. 301
- (4) B00568 Compound - Cutting and Coloring, Schaffner No. 521, White Bar
- (5) B00567 Compound - Coloring, Schaffner No. 4094, Green Bar

EFFECTIVITY

ALL

12-25-01

02

Page 316
Aug 22/01

- (6) D00281 Lubricant - Petroleum jelly
 - (7) G02045 Pad - Scotch Brite, Fine or Ultrafine
 - (8) B00569 Paste - Fine Polishing, Schaffner
No. AS0410
 - (9) B00570 Polish - Turco 1495-X
 - (10) G00033 Wiper - BMS 15-5D, Class A
- C. References
- (1) AMM 51-21-04/701, Alodine Coating
- D. Prepare to Polish the Surface

S 103-017

- (1) Use the Clean the External Surfaces of the Airplane procedure to clean the surfaces you will polish.
- E. Polish the Surface

S 353-036

WARNING: DO NOT POLISH THE STATIC PORTS. IF POLISHING MATERIAL ENTERS THE STATIC PORTS, IT MAY CAUSE LARGE ERRORS IN AIRSPEED-SENSING AND ALTITUDE-SENSING SIGNALS, WHICH MAY LEAD TO LOSS OF SAFE FLIGHT.

- (1) PROCEDURE I - Polish the surface to repair light stains or to make the surface bright.

NOTE: Polishing is only accomplished on unpainted surfaces. Painted surfaces do not get polished.

- (a) Use the wiper to remove the outer layer of protection as necessary.
- (b) Manually or mechanically polish the surface as follows:
 - 1) ALTERNATIVE I - Manually polish the surface.
 - a) Apply AS-0410 fine polishing paste or Turco 1495-X polish to the BMS 15-5D Class A wiper.

NOTE: Any polish listed in document D6-9002 is acceptable for polishing.

- b) Rub the damaged area of the surface with the wiper.

NOTE: Rub in the direction of the grain of the metal until you get the necessary finish.

- 2) ALTERNATIVE II - Mechanically polish the surface.
 - a) Apply AS-0410 fine polishing paste or Turco 1495-X polish to the BMS 15-5D Class A wiper.
 - b) Polish the damaged area of the surface with the orbital air-driven sander/polisher.

EFFECTIVITY

ALL

12-25-01

03

Page 317
Apr 22/07

(c) Remove the remaining polish material with solvent and wipers.

NOTE: Always wipe in the direction of the grain of the metal.

(d) If necessary, use ALTERNATIVE I or II to polish the surface again.

NOTE: If the polished area is too bright, rub the area with an ultrafine Scotch-Brite pad. Remove the dried polish with solvent and wipers.

(e) Rub the area around the polished area to get a constant finish.

(f) Do the Clean the External Surfaces of the Airplane procedure in the polished area.

(g) Put some water on the surface, and make sure the water becomes drops.

(h) If the surface was conversion coated before it was polished, apply Alodine 1000 with a swab, cloth, or sponge (AMM 51-21-04/701).

S 603-019

(2) PROCEDURE II - Polish the surface to remove heavy stains or scratches that do not penetrate the clad aluminum.

(a) Use these steps to find if the scratch penetrated the clad aluminum:

- 1) Apply BMS 3-2 cleaning solvent to a wiper.
- 2) Use the wiper to clean the area around the scratch.
- 3) Dry the surface.
- 4) Apply masking tape around the scratch.

NOTE: Make sure there is no more than 1/32 inch of bare metal around the scratch.

WARNING: DO NOT GET CLAD PENETRATING SOLUTION IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. IF YOU GET CLAD PENETRATING SOLUTION IN YOUR EYES, IMMEDIATELY FLUSH YOUR EYES WITH WATER. IF YOU GET CLAD PENETRATING SOLUTION ON YOUR SKIN, IMMEDIATELY FLUSH YOUR SKIN WITH WATER. MAKE SURE YOU WEAR SPLASH GOGGLES OR A FACE SHIELD. MAKE SURE YOU WEAR CHEMICAL RESISTANT GLOVES WHEN YOU PREPARE THE CLAD PENETRATING SOLUTION.

5) Prepare the clad penetrating solution as follows:

- a) Mix 200 grams of Potassium Nitrate (KN03) and 100 grams of Sodium Hydroxide (NaOH) with sufficient water to make one liter of clad penetrating solution.

EFFECTIVITY

ALL

12-25-01

03

Page 318
Aug 22/01

WARNING: DO NOT GET CLAD PENETRATING SOLUTION IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. IF YOU GET CLAD PENETRATING SOLUTION IN YOUR EYES, IMMEDIATELY FLUSH YOUR EYES WITH WATER. IF YOU GET CLAD PENETRATING SOLUTION ON YOUR SKIN, IMMEDIATELY FLUSH YOUR SKIN WITH WATER. MAKE SURE YOU PUT ON SPLASH GOGGLES OR A FACE SHIELD. MAKE SURE YOU PUT ON CHEMICAL RESISTANT GLOVES WHEN YOU APPLY THE CLAD PENETRATING SOLUTION..

CAUTION: MAKE SURE YOU PUT THE CLAD PENETRATING SOLUTION ONLY ON THE SCRATCH. THE SOLUTION WILL CAUSE DAMAGE TO THE SURFACE WHERE IT IS APPLIED.

- 6) Apply one drop of clad penetrating solution with the point of a toothpick to the deepest part of the scratch.

NOTE: Use the minimum quantity of the clad penetrating solution necessary to flow to the bottom of the scratch.

- 7) If there is a positive reaction, immediately flush the scratch with water. Do not let the clad penetrating solution stay on the scratch for more than three minutes.

NOTE: If the bottom of the scratch becomes black, then the scratch penetrated the clad to the base metal.

WARNING: ONLY ADD ACID TO WATER. NEVER ADD WATER TO ACID OR A VIOLENT REACTION MAY OCCUR.

WARNING: DO NOT GET NITRIC ACID IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. IF NITRIC ACID GETS IN YOUR EYES, IMMEDIATELY FLUSH YOUR EYES WITH WATER. IF NITRIC ACID GETS ON YOUR SKIN, IMMEDIATELY FLUSH YOUR SKIN WITH WATER. MAKE SURE YOU WEAR SPLASH GOGGLES OR A FACE SHIELD. MAKE SURE YOU PUT ON A RESPIRATOR AND ACID RESISTANT GLOVES WHEN YOU PREPARE THE NITRIC ACID SOLUTION.

- 8) Prepare the nitric acid solution as follows:
 - a) Mix one volume of acid, O-N-350 with two to three volumes of water.

EFFECTIVITY

ALL

12-25-01

02

Page 319
Aug 22/05

WARNING: DO NOT GET NITRIC ACID IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. IF NITRIC ACID GETS IN YOUR EYES, IMMEDIATELY FLUSH YOUR EYES WITH WATER. IF NITRIC ACID GETS ON YOUR SKIN, IMMEDIATELY FLUSH YOUR SKIN WITH WATER. MAKE SURE YOU WEAR SPLASH GOGGLES OR A FACE SHIELD. MAKE SURE YOU PUT ON ACID RESISTANT GLOVES AND A RESPIRATOR WHEN YOU APPLY THE NITRIC ACID SOLUTION.

- 9) Apply one drop of the nitric acid solution to the scratch.
- 10) Let the nitric acid solution stay on the scratch for one-half to one minute.
- 11) Flush the scratch with clean water.

WARNING: DO NOT GET CHEMICAL CONVERSION COATING IN YOUR MOUTH, IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. IMMEDIATELY FLUSH CHEMICAL CONVERSION COATING FROM YOUR SKIN. IF CHEMICAL CONVERSION COATING GETS IN YOUR EYES, IMMEDIATELY FLUSH YOUR EYES WITH WATER FOLLOWED BY AN EYE WASH OF BORIC ACID SOLUTION. MAKE SURE YOU PUT ON A RESPIRATOR AND PROTECTIVE GLOVES WHEN YOU APPLY THE CHEMICAL CONVERSION COATING. KEEP THE CHEMICAL CONVERSION COATING AWAY FROM SPARKS, FLAME, AND HEAT. CHEMICAL CONVERSION COATING IS POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- 12) Apply Alodine 1000 to the scratch with a swab, cloth, or sponge (AMM 51-21-04/701).
- (b) If the scratch penetrated the clad aluminum, do PROCEDURE III.
- (c) Use the Clean the External Surfaces of the Airplane procedure to clean around the scratch.
- (d) If the surface is badly scratched, rub it with fine or ultrafine Scotch-Brite pads to make it smoother.
- (e) Polish with the air-driven sander/polisher as follows:

NOTE: Polish the airplane surface first with Schaffner No. 521 white bar compound. Polish with the Schaffner No. 521 white bar compound until all of the gray undercast is removed. Then apply the No. 4094 green coloring bar compound.

Always clean the surface with solvent before you change to a different bar compound.

- 1) Remove the dried polish material from the buffer wheel with a wheel rasp or a coarse file.
- 2) Apply the applicable polishing compound to the buffer wheel.

EFFECTIVITY

ALL

12-25-01

02

Page 320
Aug 22/05

- 3) Hold the buffer wheel parallel to the direction that you polish.
- 4) Polish in the forward-to-aft direction.
- 5) Use sufficient pressure to remove the stains and scratches.
- 6) Move the buffer wheel in the correct direction to keep the finish in a good condition.
- 7) Apply the applicable polishing compound to the buffer wheel frequently.
- 8) Remove the dried polish material from buffer wheel frequently.
- 9) Remove the dried polish material from the airplane surface with the wipers and solvent.

NOTE: Put solvent on the heavy polish material to make it soft before you wipe it off.

- 10) Do the Clean the External Surfaces of the Airplane procedure in the polished area.
- 11) Put some water on the surface, and make sure the water becomes drops.
- 12) If the surface was conversion coated before it was polished, apply Alodine 1000 with a swab, cloth, or sponge (AMM 51-21-04/701).

S 603-020

- (3) PROCEDURE III – Polish the surface to repair damage that penetrates the clad aluminum.

NOTE: There is a test in PROCEDURE II to find if a scratch penetrates the clad aluminum.

- (a) Use the soft wipers to clean the damaged area.

NOTE: Wipe the damaged area carefully to prevent scratches.

- (b) Remove the burr edge as follows:
- 1) Apply the lubricant to the burnishing tool.
 - 2) Move the burnishing tool in the direction of the scratch so that the clad aluminum material is moved into the defective area.

NOTE: Keep the area that you burnish to a minimum.

- 3) Move the burnishing tool on the repaired area so the area has a smooth surface, and so the stress is applied on a large area.
- 4) If the burnished area blends in with the adjacent surface, no further work is necessary.
- 5) If the burnished area does not blend in with the adjacent surface, continue as shown in PROCEDURE II.

F. Put the Airplane Back In Its Usual Condition

EFFECTIVITY

ALL

12-25-01

04

Page 321
Dec 22/01

S 843-037

WARNING: FAILURE TO REMOVE COVERS FROM PITOT PROBES BEFORE FLIGHT MAY CAUSE LARGE ERRORS IN AIRSPEED-SENSING AND ALTITUDE-SENSING SIGNALS WHICH MAY LEAD TO LOSS OF SAFE FLIGHT.

CAUTION: REMOVE ALL COVERS. ENGINES SHOULD NOT BE OPERATED WITH COVERS IN PLACE BECAUSE THE COVERS CAN COME OFF AND DAMAGE THE ENGINES.

CAUTION: MAKE SURE THE PITOT-STATIC PROBE COVERS ARE IN GOOD WORKING CONDITION WITH NO EVIDENCE OF DAMAGE, ESPECIALLY FRAYING AROUND THE COVER OPENING. FRAYED FIBERS FROM THE COVER COMBINED WITH OTHER SUBSTANCES SUCH AS DIRT, GREASE AND FLUIDS CAN CAUSE OBSTRUCTION IN THE PROBE.

- (1) Remove the coverings from the following components:
 - (a) Pitot static probes
 - (b) Angle of Attack Sensor
 - (c) Engine inlet, fan exhaust, and turbine exhaust (AMM 71-00-03/201).
 - (d) Brakes
 - (e) Tires

S 843-038

- (2) Remove the "PITOT PROBES COVERED" tag from the left control wheel.

S 843-039

WARNING: FAILURE TO REMOVE BARRICADE TAPE AND VINYL ADHESIVE TAPE FROM STATIC PORTS BEFORE FLIGHT MAY CAUSE LARGE ERRORS IN AIRSPEED-SENSING AND ALTITUDE-SENSING SIGNALS, WHICH MAY LEAD TO LOSS OF SAFE FLIGHT.

CAUTION: REMOVE ALL BARRICADE TAPE, COVERS, POLYETHYLENE SHEET AND VINYL ADHESIVE TAPE. ENGINES SHOULD NOT BE OPERATED WITH COVERS IN PLACE BECAUSE THE COVERS CAN COME OFF AND DAMAGE THE ENGINES.

- (3) Remove all barricade tape, covers, polyethylene sheet and vinyl adhesive tape from the following openings:
 - (a) Static ports
 - 1) Inspect each static port and if necessary use naphtha or equivalent, and a clean dry rag to remove all tape residue, dirt and other contaminants around the port.
 - (b) Surge tank and fuel tank vents
 - (c) APU exhaust duct outlet port
 - (d) APU oil cooling air exhaust port

EFFECTIVITY

ALL

12-25-01

03

Page 322
Aug 22/05

 **BOEING**
767
MAINTENANCE MANUAL

- (e) Equipment cooling ground supply valve port
- (f) Overboard exhaust valve port
- (g) Smoke clearance valve port
- (h) Ram air inlet and outlet doors
- (i) Outflow valve
- (j) Doors

S 843-040

- (4) Remove the "STATIC PORTS COVERED" tag from the left control wheel.

EFFECTIVITY

ALL

12-25-01

02

Page 323
Aug 22/01

BIRD STRIKE CLEANING – MAINTENANCE PRACTICES

1. General

- A. The procedure has the steps for the safe removal of pieces of a bird from the outer side of the airplane.

TASK 12-25-04-102-001

2. Bird Strike Cleaning

A. Consumable Materials

- (1) B00130 – Alcohol, Isopropyl – TT-1-735
- (2) G01043 – Cloth, Lint-Free
- (3) G50140 – Gloves, Protective
- (4) G50436 – Disinfectant

B. References

- (1) AMM 05-51-18/201, Bird/Hail Strike Conditional Inspection

C. Procedure

S 012-002

- (1) Get access to the bird strike area.

S 162-006

WARNING: PUT ON EQUIPMENT FOR PROTECTION BEFORE YOU TOUCH THE BIRD CARCASS, BLOOD, GUTS, AND AN RESIDUE. THIS CAN CONTAIN BACTERIA AND VIRUSES THAT CAN CAUSE ILLNESSES, AND INJURIES TO PERSONNEL.

WARNING: DO NOT LET THE BIRD CARCASS OR OTHER PIECES OF THE BIRD TOUCH YOUR SKIN. DISCARD THE BIRD PIECES IN A PLASTIC DISPOSAL BAG. THE BIRD PIECES CAN CONTAIN INFECTIOUS MATERIALS (BACTERIA AND VIRUSES). THEY CAN CAUSE ILLNESSES, AND INJURIES TO PERSONNEL.

WARNING: PUT THE BIRD PIECES INTO PLASTIC DISPOSAL BAGS WHEN YOU REMOVE THEM FROM THE AIRPLANE. OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT, AND LAW ENFORCEMENT REGULATIONS WHEN YOU DISCARD THIS MATERIAL. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

- (2) Clean the bird pieces from the airplane.
 - (a) Discard the bird pieces in a plastic bag.
 - (b) Clean the area with isopropyl alcohol and disinfectant.

EFFECTIVITY

ALL

12-25-04

01

Page 201
Apr 22/07

 **BOEING**
767
MAINTENANCE MANUAL

(c) Make sure that you remove all signs of bird material from the airplane.

S 212-005

- (3) After you remove the bird pieces from the airplane, do this task:
Bird/Hail Strike Conditional Inspection (AMM 05-51-18/201).

EFFECTIVITY

ALL

12-25-04

01

Page 202
Apr 22/07

ACCESS DOORS AND PANELS – MAINTENANCE PRACTICES

1. General

A. This section gives instructions that must be obeyed when removing and installing an access door or panel, and the following components:

- (1) Bonding Jumpers
 - (a) If disconnecting a bonding jumper when removing a panel, be sure to reconnect it when installing the panel.
- (2) Aluminum and Steel Fasteners
 - (a) Make sure to know which fasteners are aluminum and which are steel. If it is not known which fasteners are aluminum, they can accidentally be tightened to the torque value for a steel fastener. Care should be taken to use the correct torque, or damage to the fastener can occur.
- (3) Faying Surface Seals
 - (a) If a faying surface seal is broken during a panel removal, a new faying surface seal must be applied during the panel installation (AMM 51-31-01/201).

NOTE: Most access panels do not have a faying surface seal. If a panel has a faying surface seal, apply BMS 5-95 sealant if the panel does not touch fuel, and BMS 5-26 sealant if the panel touches fuel (unless other AMM procedures are specified).

- (b) Aerodynamic sealant is not required on panels that are removed as frequently as every "C" check. If the access panel is only removed at intervals longer than a "C" check, replace the aerodynamic seal with BMS 5-95 in critical airflow areas and BMS 5-44 in non-critical airflow areas. Refer to SRM 51-10-01 for the location of these airflow areas. Refer to AMM 51-31-00/001 for other sealing requirements.

EFFECTIVITY

ALL

12-30-00

02

Page 201
Apr 22/08

COLD WEATHER MAINTENANCE – SERVICING

1. General

- A. Airplane operation in cold weather conditions can cause special problems. These problems occur because of the effects of the ice, snow, slush, frost, and low temperatures. Maintenance persons must know the effects of cold weather to keep the costs and time to a minimum. This procedure has the data for protection against ice, snow, slush and frost from the airplane. The procedure gives data for the prevention of subsequent ice, snow, slush and frost. It also includes other related data for the operation of the airplane in cold weather. The operator must find and use the correct procedures for the weather conditions that occur.
- B. The person that does the work must make sure the procedures for operation of equipment during ice, snow and/or frost conditions are satisfactory for his conditions of operation. Use the data that follow to make sure the procedures are satisfactory:
 - (1) The cold weather conditions that occurred before.
 - (2) The equipment or materials that are available.
 - (3) The weather conditions at the airport where you will operate.
- C. In cold weather it is necessary to drain the fuel tank sumps prior to refueling to remove water from the fuel tanks if the airplane has been idle for more than 45 minutes prior to refueling. Drain the fuel tank sumps again after refueling if the airplane has been idle for 2 hours or more after refueling, prior to departure. In cold weather water can freeze, and not let the drain valves open.
- D. Low temperatures (below freezing) can affect grease viscosity. Lubricate landing gear and flight control components in warm weather or a heated hangar.
 - (1) If lubrication must be accomplished in cold weather, warm air or electric heat blankets can be used to heat the components and the grease gun.
 - (2) For the landing gear, an enclosure can be fabricated around the strut to make the heating more efficient.
 - (3) Do not apply heat directly to tires.
- E. Definitions
 - (1) Ice that has accumulated on the fan blades while the airplane has been on the ground for a prolonged stop, such as a plane that has been parked overnight, is considered Ground-Accumulated Ice.
 - (a) Ground-Accumulated Ice must be removed before take-off.

EFFECTIVITY

ALL

12-33-01

03C

Page 301
Apr 22/08

- (2) Ice that has accumulated on the fan blades while the engine is idle is considered Operational Ice.
 - (a) Operational Ice is allowed before departure because it can be removed by engine run-ups during taxi-out.
- (3) Deicing is a procedure to remove frost, ice or snow from the airplane. Hot water or a hot mixture of water and deicing/anti-icing fluid is applied to do this.
 - (a) Alternate methods of deicing are forced air and infrared deicing. Refer to FAA Notice 8000.XXX for the current winter season, which includes industry information on these alternate methods.
- (4) Anti-icing is a procedure to make sure that ice, snow and/or frost does not collect and become attached to the airplane surfaces. Anti-icing fluid or a mixture of anti-icing fluid and water is applied to the airplane to do this.
- (5) One step deicing/anti-icing applies a hot deicing/anti-icing fluid or mixture of fluid and water. Use the conditions that follow to make a decision on how hot to make the fluid or fluid and water mixture.
 - (a) The ambient temperature
 - (b) The weather conditions
- (6) Two step deicing/anti-icing has the steps that follow:
 - (a) Apply hot water or a hot mixture of deicing/anti-icing fluid and water to remove the ice.
 - (b) Immediately follow with an overspray of a deicing/anti-icing fluid or a mixture of deicing/anti-icing fluid and water for anti-icing. This step must be done less than 3 minutes after you started the first step. If it is necessary, do the procedure area by area.
- (7) Holdover time is the approximate time anti-icing fluid will keep the frost, ice, or snow off of the airplane surfaces that have protection.

NOTE: You cannot find the level of protection or holdover time with precision. The weather conditions and the fluid/fluid mixture will have an effect on the holdover time. Refer to FAA Notice 8000.XXX for the current winter season. This document includes tables for the Holdover Times for all commercially available deicing fluids that have been certified for the current winter season.

EFFECTIVITY

ALL

12-33-01

03C

Page 302
Apr 22/08

- (8) The application of Type II, III, and IV fluid, especially when used in a one-step process or in the first step of a two-step process, may cause residues to collect in aerodynamically quiet areas, cavities and gaps. The application of hot water or heated Type I fluid in the first step of a two-step process will minimize the formation of residues. Refer to figure 301 for application guidelines. Residues may rehydrate and freeze under certain temperature, high humidity and/or rain conditions and may block or impede critical flight control systems. If a Type II, III, or IV fluid is used in a one-step process or in the first step of a two-step process, then an appropriate inspection and cleaning program should be established. Whenever suitable, deice and anti-ice with only Type I.
 - (9) Deicing fluid residues can slowly migrate out of crevice areas after being removed from open areas by cleaning. Repeated cleaning of the aircraft may be necessary. The deicing fluid residue inspection and cleaning steps in this procedure should be used to remove these residues.
 - (10) Type I (not thickened) deicing/anti-icing fluids usually have a minimum of 80 percent Glycol. The temperature makes the viscosity change but shear stress does not. These fluids give anti-icing for only a short time.
 - (11) Type II, Type III, and Type IV (thickened) deicing/anti-icing fluids usually have a minimum of 50 percent Glycol. There is also 45 to 50 percent water plus thickeners and inhibitors. The temperature and the shear stress that is applied can make the viscosity of these fluids change. They are usually highly viscous at low levels of shear stress. When the shear stress increases, their viscosity decreases very quickly. Type II, Type III, and Type IV fluids give longer holdover times than Type I deicing/anti-icing fluids.
- F. An airplane that is parked, for this cold weather procedure, is an airplane in the loading area for a short time to be prepared for departure. If the airplane stays in the loading area through the night in cold weather conditions, refer to the Guidelines for parked airplanes in this procedure. Cold weather operation does not include an airplane that is parked for a long time. This is included in Chapter 10.
 - G. Slush is ice and/or snow that is not fully melted. Thus, the ice removal/anti-icing procedures for ice and snow removal apply to slush. A special procedure for slush is not necessary.
 - H. Start of electronic equipment in the cold weather operation is the same as usual operation. A special procedure is not necessary.
 - I. The engine start procedure for cold weather operation is given in Chapter 71.
 - J. The APU start procedure is given in Chapter 49.

TASK 12-33-01-603-001

2. Cold Weather Maintenance Procedure

A. References

- (1) AMM 10-11-03/201, Parking in High Winds
- (2) AMM 12-14-01/301, Potable Water System
- (3) AMM 12-17-01/301, Waste Tank

EFFECTIVITY

ALL

12-33-01

02C

Page 303
Dec 22/08

(4) AMM 71-00-00/201, Power Plant

B. Equipment

WARNING: MAKE SURE YOU USE THE CORRECT EQUIPMENT FOR THE FLUID YOU USE. MECHANICAL OR EQUIPMENT SHEAR OF THE FLUID CAN OCCUR IF THE CORRECT EQUIPMENT IS NOT USED. IF THIS OCCURS, THE VISCOSITY OF MANY TYPE II, TYPE III, AND TYPE IV FLUIDS AND THE HOLDOVER TIME WILL DECREASE. MAKE SURE YOU REFER TO THE MANUFACTURER'S GUIDELINES FOR THE FLUID THAT YOU USE.

- (1) Ground equipment that is correct and satisfactory for use with the materials that follow:
 - (a) Deicing/Anti-Icing Truck
 - (b) Boomtruck or Cherry-picker
 - (c) Water
 - (d) Type I, II, III, or Type IV deicing fluid
 - (e) Type I, II, III, or Type IV anti-icing fluid
 - (f) Hot Air Source.

C. Consumable Materials

NOTE: The applicable fluids which obey the Boeing document D6-17487, "Evaluation of Airplane Maintenance Materials" and conform to any of the following specifications, are acceptable fluids:

- (1) Type I (newtonian) fluids:
 - (a) G02301 Fluid SAE AMS 1424 latest revision
- (2) Type II, Type III, and Type IV (non-newtonian) fluids:
 - (a) G02301 Fluid SAE AMS 1428 latest revision

D. Guidelines

S 663-023

CAUTION: THE REPEATED APPLICATION OF TYPE II, TYPE III, AND TYPE IV DEICING/ANTI-ICING FLUIDS, WITHOUT THE SUBSEQUENT APPLICATION OF TYPE I DEICING/ANTI-ICING FLUID OR HOT WATER, MAY CAUSE A RESIDUE TO COLLECT IN AERODYNAMICALLY QUIET AREAS. THIS RESIDUE MAY REHYDRATE AND FREEZE UNDER CERTAIN TEMPERATURE, HIGH HUMIDITY AND/OR RAIN CONDITIONS. THIS RESIDUE MAY BLOCK OR IMPEDE CRITICAL FLIGHT CONTROL SYSTEMS. THIS RESIDUE MAY REQUIRE REMOVAL.

- (1) General
 - (a) Many conditions can have an effect on which procedure you use to remove ice, snow, or frost to make sure it does not collect and become attached to the airplane surfaces. Each operator must look at the local weather conditions. If it is possible, use the procedures that were used before under the same conditions. A general guideline is, Type II, Type III, and Type IV fluids give a longer holdover time than Type I fluids. Use Type II, Type III, and Type IV fluids to decrease the risk that ice, snow, or frost will collect on the airplane during a long taxi.

EFFECTIVITY

ALL

12-33-01

02C

Page 304
Dec 22/08

- (b) Use a heated mixture of water and either Type I, II, III, or Type IV deicing/anti-icing fluids when you do the one-step ice removal/anti-icing. The three items below will have an effect on the quantity of water mixed with the fluid and the temperature you use:
 - 1) The weather conditions
 - 2) The holdover protection that is necessary
 - 3) The condition of the airplane.
- (c) It is necessary to have sufficient fluid temperature and flow rate to flush the ice and snow from the airplane surfaces when it collects there. More ice, snow or frost will not collect on the airplane surfaces where there is remaining fluid. The mixture and type of fluid used will have an effect on the holdover time. The weather conditions can make it necessary to apply the fluid/water mixture again. This will be necessary to remove the frozen fluid that collected since the fluid/water mixture was applied last. This is also done to increase the protection time.

CAUTION: DO NOT POINT A SOLID FLOW OF FLUID DIRECTLY AT THE SURFACE. APPLY THE FLUID AT A LOW ANGLE TO PREVENT DAMAGE TO THE AIRPLANE SURFACES. DO NOT USE HIGH PRESSURE SPRAY TO BLOW THE ICE AND SNOW OFF THE AIRPLANE SURFACES.

- (d) For the best results in ice or snow removal, you must increase the temperature of deicing fluid and hot water to 140–180°F (60–82°C), at the nozzle. A fine to medium spray is recommended to apply the fluid across a large area of ice or snow. This will cause the ice or snow to melt the fastest. A solid flow of fluid is recommended to flush the ice or snow from the airplane surfaces. Make sure the maximum force of the solid flow of fluid on the surfaces is not more than 10 psi on an area of 25 square inches. This will prevent damage to the surfaces.
- (e) A layer of anti-icing fluid will give protection from ice, snow, and frost if you apply the fluid to a dry wing on a cold soaked airplane. A mixture of anti-icing fluid and water (the ambient temperature will have an effect on when to use a mixture with water) will also give protection if you apply it to a dry wing.
- (f) Since the temperature of the external surfaces of the airplane can be below freezing, ice can occur and attach to the surface. There can be clear ice below the layer of snow or slush, which is not easy to find. Make sure that all the ice is removed after you do the ice removal or ice removal/anti-icing procedure. Possibly it will be necessary to feel the surface to do the inspection.

EFFECTIVITY

ALL

12-33-01

03C

Page 305
Apr 22/08

- (g) When precipitation is continuous, the two-step ice removal/anti-icing procedure is usually recommended. Use one of the items that follow to find the quantity of the fluid to use in the mixture:
 - 1) The airline experience
 - 2) The instructions of the fluid manufacturer
 - 3) The air temperature.
- (h) Maintenance persons must closely inspect the airplane before departure to make sure there will be no ice, snow, or frost on the wing for takeoff.
- (i) You must remove snow from a parked airplane regularly. This will make sure that a large quantity of snow will not collect and possibly freeze on the airplane surface.

CAUTION: CAREFULLY MOVE ROPES OR FABRIC HOSES ON THE WING OR FUSELAGE. EQUIPMENT THAT IS INSTALLED ON THE SURFACE OF THE WING OR FUSELAGE CAN BE DAMAGED BY THE MOVEMENT OF THE ROPES OR FABRIC HOSE.

- (j) Use brooms with long handles to remove the snow from the wings and horizontal stabilizers. This will make it easier. You can use ropes or a fabric fire hose to remove snow from the fuselage. Move the rope or hose back and forth on top of the fuselage as you move it aft.
- (k) Before you move an airplane out of a warm hangar during icing conditions, do the anti-icing procedure on the airplane. This will make it less possible that ice or snow will melt when it touches the warm airplane and then freeze again.
- (l) If you remove ice with water that is not hot you must do it in a warm hangar. Keep the airplane in the hangar until the surfaces are dry. It will be necessary to do a check of those areas where the water can collect and freeze. If anti-icing fluid is applied, it is not as necessary for the airplane to dry.

S 943-026

(2) General Precautions

WARNING: DEICING/ANTI-ICING FLUID IS DANGEROUS. DO NOT LET IT TOUCH THE SKIN OR EYES, AND WEAR CLOTHING TO GIVE SUFFICIENT PROTECTION.

WARNING: DO NOT POINT THE DEICING FLUIDS DIRECTLY INTO THE APU OR ENGINE INLETS, EXHAUSTS, DUCTS, AND PITOT-STATIC PROBES. THESE FLUIDS CAN CAUSE DAMAGE TO THE EQUIPMENT AND MAKE THE AIR DATA INCORRECT.

- (a) Do not point a spray of deicing/anti-icing fluid directly at or into the pitot inlets, TAT probes or static ports.

EFFECTIVITY

ALL

12-33-01

03C

Page 306
Apr 22/08

GUIDELINE SUMMARY FOR APPLICATION OF TYPE I FLUID MIXTURES (MINIMUM CONCENTRATIONS) AS A FUNCTION OF OAT			
OUTSIDE AIR TEMPERATURE OAT	ONE-STEP PROCEDURE	TWO-STEP PROCEDURE	
	DEICING/ANTI-ICING	1ST STEP: DEICING	2ND STEP: ANTI-ICING
27°F (-3°C) AND ABOVE	MIX OF FLUID AND WATER HEATED TO 140°F (60°C) MINIMUM, 180°F (82°C) MAXIMUM AT THE NOZZLE, WITH A FREEZING POINT OF AT LEAST 18°F (10°C) BELOW OAT	WATER OR A MIX OF FLUID AND WATER HEATED 140°F (60°C) MINIMUM AT THE NOZZLE	MIX OF FLUID AND WATER HEATED TO 140°F (60°C) MINIMUM, 180°F (82°C) MAXIMUM AT THE NOZZLE, WITH FREEZING POINT OF AT LEAST 18°F (10°C) BELOW OAT
27°F (-3°C) BELOW		FP OF HEATED FLUID MIXTURE SHALL BE NOT MORE THAN 5°F (3°C) ABOVE ACTUAL OAT	

TYPE I FLUID

°C DEGREES CELSIUS
°F DEGREES FAHRENHEIT
OAT OUTSIDE AIR TEMPERATURE
FP FREEZING POINT

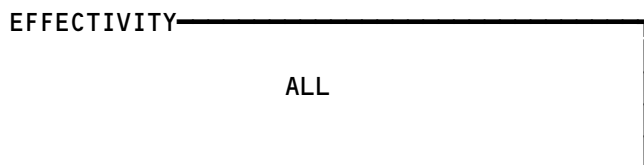
CAUTION: WING SKIN TEMPERATURES MAY DIFFER AND IN SOME CASES MAY BE LOWER THAN OAT.
A STRONGER MIX (MORE GLYCOL) CAN BE USED UNDER THESE CONDITIONS.

NOTE: THIS TABLE IS APPLICABLE FOR THE USE OF TYPE I HOLDOVER TIME GUIDELINES. IF
HOLDOVER TIMES ARE NOT REQUIRED, A TEMPERATURE OF 140°F (60°C) MINIMUM,
180°F (82°C) MAXIMUM AT THE NOZZLE IS DESIRABLE.

UPPER TEMPERATURE LIMIT SHALL NOT EXCEED FLUID MANUFACTURER'S
RECOMMENDATION.

TO BE APPLIED BEFORE FIRST STEP FLUID FREEZES, TYPICALLY WITHIN 3 MINUTES

Fluid Mixture Guidelines for Deicing
Figure 301 (Sheet 1)



12-33-01

02C

Page 307
Dec 22/07

HD4191

GUIDELINE FOR APPLICATION OF TYPE II, III, AND IV FLUID MIXTURES			
OUTSIDE AIR TEMPERATURE OAT	ONE-STEP PROCEDURE 2	TWO-STEP PROCEDURE	
	DEICING/ANTI-ICING	1ST STEP: DEICING	2ND STEP: ANTI-ICING 1
27°F (-3°C) AND ABOVE	50/50 HEATED TYPE II, III OR IV	HEATED WATER OR A HEATED MIX OF TYPE I, II, III, OR IV AND WATER	50/50 TYPE II, III OR IV
BELOW 27°F (-3°C) TO 7°F (-14°C)	75/25 HEATED TYPE II, III OR IV	HEATED SUITABLE MIX OF TYPE I, II, III, OR IV, AND WATER WITH FP NOT MORE THAN 5°F (3°C) ABOVE ACTUAL OAT	75/25 TYPE II, III OR IV
BELOW 7°F (-14°C) TO -13°F (-25°C)	100/0 HEATED TYPE II, III OR IV		100/0 TYPE II, III OR IV
BELOW -13°F (-25°C)	TYPE II/IV FLUID MAY BE USED BELOW -13°F (-25°C) PROVIDED THAT THE FREEZING POINT OF THE FLUID IS AT LEAST 13°F (7°C) BELOW OAT AND THAT AERODYNAMIC ACCEPTANCE CRITERIA ARE MET. TYPE III FLUID MAY BE USED BELOW 14°F (-10°C) PROVIDED THAT THE FREEZING POINT OF THE FLUID IS AT LEAST 13°F (7°C) BELOW OAT AND THAT AERODYNAMIC ACCEPTANCE CRITERIA ARE MET. CONSIDER THE USE OF TYPE I WHEN TYPE II, III, OR IV FLUID CANNOT BE USED.		

TYPE II, III, AND IV FLUIDS

CAUTION: WING SKIN TEMPERATURES MAY DIFFER AND, IN SOME CASES MAY BE LOWER THAN OAT. A STRONGER MIX (MORE GLYCOL) CAN BE USED UNDER THESE CONDITIONS.

AS FLUID FREEZING MAY OCCUR, 50/50 TYPE II, III OR IV FLUID SHALL NOT BE USED FOR THE ANTI-ICING STEP OF A COLD-SOAKED WING AS INDICATED BY FROST OR ICE ON THE LOWER SURFACE OF THE WING IN THE AREA OF THE FUEL TANK.

AN INSUFFICIENT AMOUNT OF ANTI-ICING FLUID, ESPECIALLY IN THE SECOND STEP OF A TWO-STEP PROCEDURE, MAY CAUSE A SUBSTANTIAL LOSS OF HOLDOVER TIME, PARTICULARLY WHEN USING A TYPE I FLUID MIXTURE FOR THE FIRST STEP (DEICING).

NOTE: FOR HEATED FLUIDS, A FLUID TEMPERATURE NOT LESS THAN 140°F (60°C) AND 180°F (82°C) MAXIMUM AT THE NOZZLE IS DESIRABLE. UPPER TEMPERATURE LIMIT SHALL NOT EXCEED FLUID MANUFACTURER'S RECOMMENDATIONS.



- 1 TO BE APPLIED BEFORE FIRST STEP FLUID FREEZES, TYPICALLY WITHIN 3 MINUTES
- 2 CLEAN AIRCRAFT MAY BE ANTI-ICED WITH UNHEATED FLUID.

Fluid Mixture Guidelines for Deicing
Figure 301 (Sheet 2)

EFFECTIVITY

ALL

12-33-01

02C

Page 308
Dec 22/07

- (b) Do not point a spray of hot deicing fluid or hot water directly at cold windows.
- (c) The AC packs should be shut off prior to deicing.
- (d) Do not point a spray of deicing/anti-icing fluid directly into the engine, APU, scoops, vents, drains, Cabin Air Compressor (CAC) and Ram Air inlets, etc.
- (e) Do not use more than 10 psi on an area of 25 square inches. Do not point a solid flow of fluid directly at the airplane surfaces.
- (f) Make sure that ice and/or snow is not pushed into the areas around the flight controls during ice and snow removal.
- (g) Remove all of the ice or snow from the door and girt bar areas before you close a door.
- (h) Do not open the cargo doors if it is not necessary. Remove the ice and snow from the cargo containers before you put them on the airplane. Before the doors are closed for flight, put anti-icing fluid on these areas:
 - 1) The pressure relief doors
 - 2) The lower door sill
 - 3) The bottom edge of the door.
- (i) Do not use hard or sharp tools to remove ice from the airplane surface.
- (j) The right and left sides of the wing and the right and left sides of the horizontal stabilizer must get the same deicing/anti-icing procedure.
 - 1) If contamination exists only in a limited area (such as a spoiler panel) and there is no active precipitation, it is permitted to deice only that area, but the same area should also be treated on the other wing.
- (k) If SAE Type II, III or IV fluids are used, then remove all of the deicing/anti-icing fluid from the cockpit windows before departure. Make sure you closely examine windows with wipers installed. Make sure that fluid is removed from all forward areas where it can flow back on the windshields during taxi and takeoff. These areas must be clean before departure.

NOTE: Deicing/anti-icing fluid can be removed by rinsing with approved cleaner and a soft cloth or flushing with type I fluid.

WARNING: YOU MUST REMOVE DEICING/ANTI-ICING FLUID RESIDUES BEFORE TOO MUCH COLLECTS. RESIDUES CAN COLLECT IN AERODYNAMICALLY QUIET AREAS. THESE RESIDUES CAN PREVENT THE MOVEMENT OF CRITICAL FLIGHT CONTROL SYSTEMS. THIS CAN CAUSE SYSTEM DAMAGE, AND DANGEROUS FLIGHT CONDITIONS.

EFFECTIVITY

ALL

12-33-01

02C

Page 309
Apr 22/09

- (l) After the deicing/anti-icing procedure has been done many times, you must examine the following areas for deicing/anti-icing fluid residues remove the residues, and re-lubricate affected components as follows:
- 1) If the ambient temperature is at or below freezing, move the airplane to a heated hangar.
 - 2) Gain access to the following areas where flight controls and other system components are located:
 - a) Wing rear spar areas, including the actuating components for the spoilers, ailerons, flaps, flaperons (if applicable) and the control surface hinges and balance bays.
 - b) Wing leading edge devices, including the actuating components.
 - c) Horizontal stabilizer rear spar, including the actuating components for the elevators, elevator tabs (if applicable) and the control surface hinges and balance bays.
 - d) Vertical stabilizer, including actuating components for the rudder, and the control surface hinges.
 - e) APU bay and bilge area of the tailcone.
 - 3) Visually inspect for dry or rehydrated residues in the areas mentioned above.

NOTE: Dry residue will normally be a thin film that may be partially covered with dirt or grease. Rehydrated residue will often be a thicker, gel-like substance.

WARNING: DO NOT APPLY WATER TO THE CONTROL CABLES WHEN THE TEMPERATURE IS AT OR BELOW 32 DEGREES FAHRENHEIT. ICE CAN FORM ON THE CABLES AND PREVENT THE OPERATION OF IMPORTANT FLIGHT CONTROL SYSTEMS DURING FLIGHT.

- 4) Spray the area with a fine mist of warm water to rehydrate any residue and wait at least 15 minutes to allow the rehydration to occur.
 - 5) Remove the residues by hand with rags or soft brushes using warm water or a mixture of warm water and Type 1 fluid.
 - 6) You can use a low pressure stream of water or compressed air to rinse away the residues.
 - a) When rinsing the residues away, make sure the residues do not flow into crevice areas that are not accessible.
- (m) Check all drain holes in the areas where residues were removed to make sure that they are clear and not blocked by the residues.
- (n) Re-lubricate bearings, fittings, and control cables in areas that were cleaned as required.
- (o) Re-apply corrosion inhibiting compound to all surfaces and components in areas that were cleaned as required.

EFFECTIVITY

ALL

12-33-01

02C

Page 310
Apr 22/09

- (p) When there is slush on the runways, examine the airplane when it gets to the ramp. Look for slush that has collected on the airplane or damage to the airplane surfaces.
 - 1) Examine the areas that follow for ice that collected and damage to the skin panels (remove the ice if it is necessary):
 - a) The leading edges
 - b) The flaps
 - c) The flap wells
 - d) The vertical stabilizer
 - e) The rudder
 - f) The bottom and the top surface of the horizontal stabilizers and elevators.
 - 2) Examine the wheel well areas for ice, slush and snow that has collected. Deice as necessary.
 - 3) Examine the skin panels behind the wheel wells for damaged edges.
- (q) Use the applicable Structural Repair Manual (SRM) procedure to repair any damaged skin panels.
- (r) Make sure the concentration of the deicing/anti-icing fluid is correct before you apply it to the airplane.

WARNING: DO NOT WALK ON THE WINGS OR THE HORIZONTAL STABILIZER. ICE OR SNOW ON THESE SURFACES IS NOT SAFE. MAINTENANCE PERSONS CAN FALL WHICH MAY CAUSE PERSONAL INJURY OR AIRPLANE DAMAGE.

- (s) Use a boomtruck, a cherry-picker or deicing/anti-icing truck to do deicing/anti-icing.

S 663-024

(3) Specific Requirements

(a) Control Surfaces

- 1) Retract the wing flaps, slats, and spoilers during icing conditions or when the snow falls. If it is necessary to operate these controls, make sure they are not blocked by ice or snow before you retract them.

NOTE: If an airplane comes to the gate with the flaps not fully retracted during icing conditions or when the snow falls, examine those flaps that are not fully retracted. Look for ice or snow that has collected before they are retracted.

EFFECTIVITY

ALL

12-33-01

02C

Page 311
Apr 22/09

- 2) All of the control surfaces must have no ice, snow, or frost on them. After the deicing procedure make sure there is no moisture caught in the hinges, guide tracks and actuators for the flight controls. This moisture could subsequently freeze. Apply deicing/anti-icing fluid for protection.
 - 3) Open the leading edge devices and look for ice or snow.
- (b) Wing and Horizontal Tail Surfaces
- 1) The wing, including winglets (if installed) and horizontal tail surfaces must have no ice, snow, and frost on them.

NOTE: A layer of frost 1/8-inch thick or less on the lower wing surfaces (in the spar area) is permitted if it is caused by very cold fuel. But, all of these areas must have no ice, snow or frost on them:

- a) Leading edge devices
 - b) Control surfaces, including both upper and lower surfaces of the horizontal stabilizer and the left and right sides of the vertical stabilizer
 - c) Tab surfaces
 - d) The top wing surface.
- 2) The leading edge surfaces must have no ice, snow or frost on them. Examine the areas between the movable surfaces and the surfaces that do not move to make sure there is no ice.
 - 3) Set the horizontal stabilizer leading edge in the full up and the elevator trailing edge in the full down limit (equivalent to airplane nose down) during deicing procedures.

NOTE: Horizontal stabilizer leading edge in the full up and the trailing edge in the full down positions will help prevent deicing fluid flow into the balance bay areas.

- 4) The right and left sides of the horizontal stabilizer must get the same deicing/anti-icing procedure.
 - a) If contamination exists only in a limited area (such as a spoiler panel) and there is no active precipitation, it is permitted to deice only that area, but the same area should also be treated on the other wing.
- (c) Fuselage and Vertical Tail Surfaces

EFFECTIVITY

ALL

12-33-01

03C

Page 312
Apr 22/08

CAUTION: BE CAREFUL WHEN YOU REMOVE ICE AND SNOW FROM THE FUSELAGE AREAS WHERE THERE ARE LIGHTS AND ANTENNA. IF YOU ARE NOT CAREFUL, YOU CAN CAUSE DAMAGE TO THE EQUIPMENT.

- 1) The fuselage and the vertical tail surfaces , including the left and right sides of the vertical stabilizer, must have no ice or snow on them. This will decrease the aerodynamic drag and the weight of the airplane.

NOTE: Thin hoar frost is permitted on the top surface of the fuselage if all the vents and ports are clear. Thin hoar frost is a white deposit of constant thickness with a sharp crystalline texture. It usually occurs on surfaces that are outside on a cold night with no clouds. Hoar frost is thin. You can see items on the surface below the layer of frost, such as paint lines, marks or letters.

- 2) Remove all of the snow from the nose radome area. If you do not do this, the snow will blow back and decrease the pilots' vision on takeoff.
- 3) Do not apply hot deicing fluid or hot water directly on the pilots' windshield or passenger windows. You can let the fluid flow over the windows after you apply it to the top of the cabin. This is permitted since the fluid will be cool when it gets to the windows.
- 4) If SAE Type II, III, or IV fluids are used, then all of the deicing/anti-icing fluid on the cockpit windows must be removed before departure. Look closely at the windows with wipers installed. Also, look at all forward areas where fluid can flow aft on the windshield during taxi and takeoff. These areas must be clear before departure.

NOTE: Deicing/anti-icing fluid can be removed by rinsing with approved cleaner and a soft cloth or flushing with type I fluid.

(d) Engines and APU

EFFECTIVITY

ALL

12-33-01

02C

Page 313
Aug 22/07

 **BOEING**
767
MAINTENANCE MANUAL

WARNING: PERSONS MUST STAY CLEAR OF THE DANGEROUS AREAS IN FRONT OF OR IN BACK OF AN ENGINE (AMM 71-00-00/201) WHEN THEY OPERATE. INJURY OR DEATH OF PERSONS CAN OCCUR IN THESE AREAS.

WARNING: MAKE SURE THE APU INLET AREA IS CLEAR BEFORE YOU START THE APU. THE APU CAN BE DAMAGED BY ICE OR SNOW THAT HAS COLLECTED IF IT GOES INTO THE INLET. ALSO, PERSONS MUST STAY CLEAR OF THE APU EXHAUST AREA (CHAPTER 49) WHEN THE UNIT IS OPERATING. INJURY OR DEATH OF PERSONS CAN OCCUR IN THESE AREAS.

- 1) For the safety of persons, do not operate the engines or the APU during the ice removal/anti-icing operations. But, if it is necessary to do ice removal/anti-icing procedure during engine and/or APU operation, do the steps that follow:
 - a) Make sure the engine and/or the APU is at idle speed.
 - b) Do not point the spray of deicing/anti-icing fluids directly into the engine and/or APU inlet.

CAUTION: DO NOT START THE ENGINES IN AREAS WHERE THERE ARE PUDDLES OF DEICING OR ANTI-ICING FLUID. MOVE THE AIRPLANE TO A DIFFERENT LOCATION. THE FLUID CAN GO INTO THE ENGINE COMPRESSOR. THESE FLUIDS CAN CAUSE THE COMPRESSOR TO STALL AND CAUSE THE ENGINE TO SURGE.

- 2) If the engines/APU are on, do the steps that follow:
 - a) Close the valves for the air conditioning pack and bleed valves to the cabin.

NOTE: This will keep the fumes out of the cabin when you apply deicing/anti-icing fluid in the area of the engines/APU inlets.

- 3) Turn the bleed air switches for the APU/Engine to OFF before you do the ice removal procedure. When the ice is removed, let the vapors decrease to zero before you put the bleed air switches to ON.

EFFECTIVITY

ALL

12-33-01

03C

Page 314
Apr 22/08

WARNING: DO NOT POINT THE DEICING FLUIDS DIRECTLY INTO THE APU OR ENGINE INLETS, EXHAUSTS, DUCTS, AND PITOT-STATIC PROBES. THESE FLUIDS CAN CAUSE DAMAGE TO THE EQUIPMENT AND MAKE THE AIR DATA INCORRECT.

- 4) Do not direct a spray of deicing/anti-icing fluid directly into the areas below:
 - a) The inlet ducts for the engine or APU
 - b) Exhausts
 - c) Engine thrust reversers
 - d) Engine inlet
 - e) Probes attached to the strut
 - f) Engine bleed air ducts.
- 5) Make sure the APU inlet door moves freely.
- 6) Remove ground-accumulated ice from fan blades before flight.

(e) Brakes

- 1) When deicing or anti-icing the airplane, protect the wheels and brakes from fluid contamination with the methods below:
 - a) Do not direct a spray of deicing or anti-icing fluids at the wheels or brakes.

NOTE: Carbon brakes which have been intentionally soaked with deicing or anti-icing fluids should be removed and decontaminated per the procedures found in the applicable supplier's component maintenance manual.

- b) Use suitable covers on the wheels and brakes when operationally feasible.
- c) Apply the parking brake to reduce incidental contamination of brake friction surfaces when operationally feasible.

NOTE: The brakes do not need to be re-applied if the wheels have not rotated since the last brake application.

- 2) Manually remove snow or ice accumulation from the wheels, brakes or tires. A hot air blower may be used for this purpose.

(f) Landing Gear and Doors

- 1) Make sure there is not a layer of ice and/or snow on the movable parts and the position indication switches for the landing gear. This could prevent the correct operation of the landing gear. Make sure you do not remove lubricants or make the lubricants thinner when you apply deicing/anti-icing fluids. Parts that are not lubricated can seize or not operate without the correct servicing.

EFFECTIVITY

ALL

12-33-01

03C

Page 315
Apr 22/08

- 2) Remove the ice and snow from these areas:
 - a) The landing gear doors
 - b) The door latches
 - c) The uplock mechanism
 - d) The uplockhook
 - e) The downlock mechanism
 - f) The bungee springs
 - g) The lock actuators
 - h) The position indication switches.
- 3) It is the airline's decision to apply or not apply anti-icing fluid as protection after the ice is removed.
- 4) Make sure that ice has not collected on the steering cables for the nose wheel. Remove the ice if it is necessary.
- 5) Examine the alternate extend system for ice that has collected in the areas that are open and not heated:
 - a) The landing gear alternate extension system control cables and mechanism
 - b) The external mechanism for the landing gear.

CAUTION: DO NOT MOVE THE AIRPLANE IF THE TIRES FREEZE TO THE GROUND. MAKE SURE THE WHEELS TURN WHEN YOU MOVE THE AIRPLANE.

- 6) Remove the ice and snow from the ground areas around the landing gear. This will make it less possible that the tires will freeze to the ground. This will also prevent unwanted airplane movement because of the wind or engine operation.
 - a) Use warm air or deicing fluid to release the tires from the ground or to remove frozen material.
 - b) Salt is not recommended since it can collect on the metal parts and cause corrosion.
- (g) Wing Fuel Tanks
- 1) Frost can occur on the bottom of the wings in the fuel tank areas in temperatures above freezing. This is caused by the condensation of moisture in the air when it touches on the cold surfaces that are below freezing. The frost will usually melt when you add fuel that is at a higher temperature. If the frost continues and is more than 1/8 inch thick, remove it before takeoff.
 - 2) Clear ice can occur on the top of the wing when these conditions occur:
 - a) The temperature of the fuel in the tank is below freezing
 - b) The ambient temperature is above freezing
 - c) There is rain, drizzle or fog.

EFFECTIVITY

ALL

12-33-01

03C

Page 316
Apr 22/08

- 3) Carefully examine the top of the wing to see if there is clear ice. Use the equipment that is necessary to get sufficient access to the top of the wing to do this check. It is possible that the clear ice can only be found by touch. You must remove clear ice and anti-ice the wing, if it is necessary, before the takeoff.
- (h) Miscellaneous
 - 1) Pitot Probe, Static Ports, and Total Air Temperature (TAT) Probes (Fig. 302)
 - a) Look for ice that is attached to the surface 4 feet or less from the pitot probe, static port, and TAT probe inlets. Remove all the ice in these areas.
 - b) Do not point a spray of deicing/anti-icing fluid directly at or into the pitot inlets, static ports or the TAT probes.
 - c) If ice causes a blockage of the static openings, carefully apply warm air until the ice melts.
 - d) If you applied too much fluid to the fuselage near the static ports, examine the nearest in-line drain and remove the water if it has collected there.
 - 2) Drains
 - a) Examine all of the waste water and condensate drains on the airplane to make sure there are no blockages because of ice or other material. It is not necessary to put a plug on the drains during the ice removal anti-icing procedure. But, do not point a fluid spray at these drain areas.
 - 3) Angle-of-Airflow Sensor (Fig. 302)
 - a) Make sure that no ice and/or snow is on the sensors. Make sure the sensors are free to move. Apply deicing fluid if it is necessary.
 - 4) Windshield Wiper Blades
 - a) Remove the ice that has collected on windshield wiper blades.

E. Hot Water Deicing

S 663-004

- (1) You can use hot water at 140-180°F (60-82°C) maximum nozzle temperature to remove ice and snow from the airplane surfaces when the ambient temperature is 27°F (-2.8°C), stable or on the increase.

S 663-005

- (2) To prevent the water from freezing again you must apply anti-icing fluid to the surface immediately after you remove the ice with hot water.

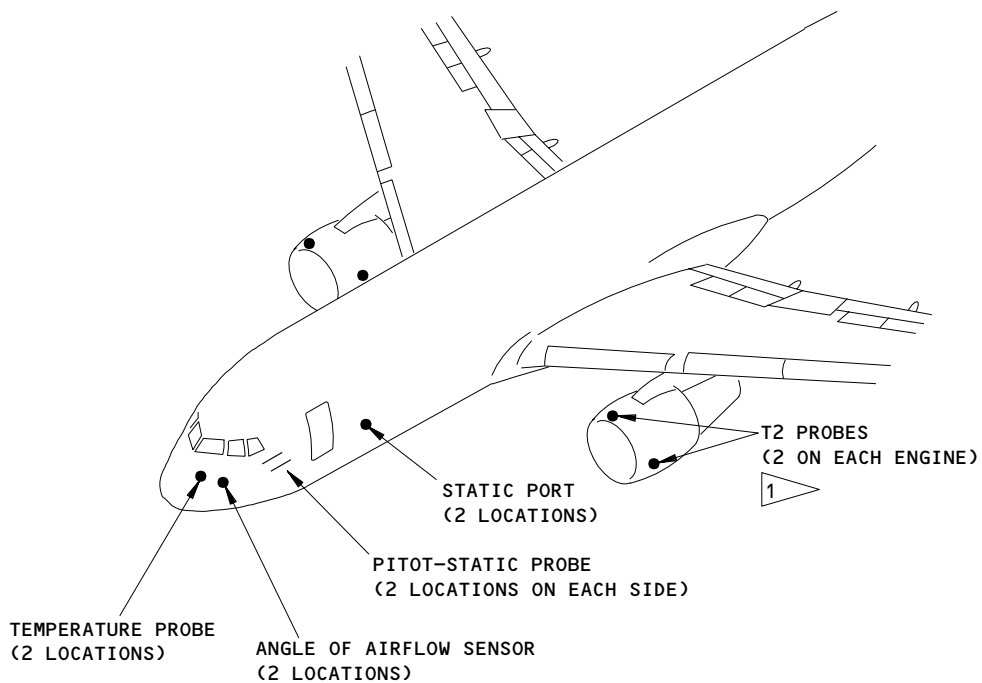
EFFECTIVITY

ALL

12-33-01

03C

Page 317
Apr 22/08



1 THE TEMPERATURE PROBES ARE INSTALLED IN THE ENGINE COWLING.

Probe Location
Figure 302

EFFECTIVITY	ALL
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12-33-01

01C

Page 318
Dec 22/05

F. One-Step Ice Removal/Anti-Icing

S 663-027

- (1) The application of Type II, III, and IV fluid, especially when used in a one-step process or in the first step of a two-step process, may cause residues to collect in aerodynamically quiet areas, cavities and gaps. The application of hot water or heated Type I fluid in the first step of a two-step process will minimize the formation of residues. Residues may rehydrate and freeze under certain temperature, high humidity and/or rain conditions and may block or impede critical flight control systems. If a Type II, III, or IV fluid is used in a one-step process or in the first step of a two-step process, then an appropriate inspection and cleaning program should be established. Whenever suitable, deice and anti-ice with only Type I.

S 663-007

- (2) You can do the one-step ice removal/anti-icing procedure, with the deicing/anti-icing fluid heated to 140-180°F (60-82°C) at the nozzle. Use this procedure to remove the ice and snow from the airplane when the temperature is below 28°F (-2.2°C). After you use the mixture to make the airplane surfaces clean, the remaining fluid will give some anti-ice protection.

S 663-008

- (3) The fluid mixed with the water can be Type I deicing (ice removal)/anti-icing fluid, Type II, Type III, or Type IV deicing/anti-icing fluid. The holdover time will be longer with the Type II, Type III, and Type IV deicing/anti-icing fluid. With each fluid, you must use the data that follows to find the quantity of fluid to use in the mixture:
- (a) The airline experience
 - (b) The fluid specification
 - (c) The manufacturer's recommendations
 - (d) The weather conditions.

S 663-009

- (4) If additional treatment is required before flight, the full deicing/anti-icing procedure must be performed. Ensure that any residues from previous treatments are flushed off.

EFFECTIVITY

ALL

12-33-01

03C

Page 319
Apr 22/08

G. Two-Step Deicing/Anti-Icing

S 663-028

- (1) The application of Type II, III, and IV fluid, especially when used in a one-step process or in the first step of a two-step process, may cause residues to collect in aerodynamically quiet areas, cavities and gaps. The application of hot water or heated Type I fluid in the first step of a two-step process will minimize the formation of residues. Residues may rehydrate and freeze under certain temperature, high humidity and/or rain conditions and may block or impede critical flight control systems. If a Type II, III, or IV fluid is used in a one-step process or in the first step of a two-step process, then an appropriate inspection and cleaning program should be established. Whenever suitable, deice and anti-ice with only Type I.

S 663-011

- (2) Two-step ice removal/anti-icing procedure is usually the recommended procedure when the precipitation conditions are continuous. The second step must be done no more than 3 minutes after the first step. Do the procedure area by area if it is necessary.

S 663-012

- (3) The items that follow will have an effect on the holdover time you get after you do the anti-icing procedure:
 - (a) The fluid that was used
 - (b) The weather conditions.

S 663-013

- (4) Do not apply an additional coating of anti-icing fluid on top of contaminated fluid (fluid that has been absorbing precipitation). If additional treatment is required before flight, the full deicing/anti-icing procedure must be performed. Ensure that any residues from previous treatment are flushed off.

H. Operation Checks

S 863-015

- (1) Before you start the engine do the steps that follow to make sure the systems will operate correctly.
 - (a) Operate all the control surfaces. Use a person on the ground to make sure the control surfaces move the full travel.
 - 1) Examine the openings in the pitot probe, probes installed on the strut or in the engine inlet, and static port. Make sure they are clear of ice or snow.
 - 2) Make sure there is no ice or snow collected on the landing gear and or in the wheel wells.
 - 3) Make sure all the inlets are clear of ice or snow.
 - 4) Make sure all the drains are clear and not blocked.

EFFECTIVITY

ALL

12-33-01

03C

Page 320
Apr 22/08

- 5) Make sure the engine compressor can turn freely.

NOTE: If the fan (N1) cannot turn during an engine start because of ice, this can cause heavy damage. When it is possible that water collected in the engine at freezing temperatures, you must make sure the fan (N1) can turn before you start the engine. You can see the low pressure (LP) rotor fan blades turn from the ground. If the wind does not turn the fan, you can turn it by hand. If you will motor the engine to make sure the engine compressor turns, use the procedure in AMM 71-00-00/201.

- 6) Make sure all of the doors, including the doors to the off-wing escape slide compartments, are clear of ice.

S 863-016

- (2) Park the Airplane

WARNING: IF HIGH WINDS ARE POSSIBLE, USE THE PROCEDURE IN AMM 10-11-03/201 TO SET THE STABILIZER.

- (a) The area where you will park the airplane must be clear of ice and snow. Chapter 10 gives the full procedures to park the airplane. Use the procedure in Chapter 10 if more steps are necessary because of the weather conditions and length of time the airplane will be parked.
- (b) When possible, point the airplane into the direction the wind is usually from.
- 1) Put the wing flaps to the full up position. This will lock the outboard ailerons in their neutral position.
 - 2) Put the stabilizer position to 4 units of trim (2 degrees down from the stabilizer leading edge).

CAUTION: EXAMINE THE ENGINE INTAKE AREAS IMMEDIATELY AFTER SHUTDOWN FOR ICE THAT IS THERE. REMOVE THE ICE WHILE THE TEMPERATURE OF THE ENGINE DECREASES AND BEFORE YOU INSTALL THE ENGINE PROTECTIVE PLUGS AND COVERS. IF YOU INSTALL THE PLUGS BEFORE THE TEMPERATURE OF THE ENGINE DECREASES, THE REMAINING HEAT IN THE ENGINE WILL MELT THE ICE TO WATER. THIS WATER WILL FLOW TO THE BOTTOM OF THE FAN SECTION. IT WILL FREEZE AGAIN WHEN THE TEMPERATURE OF THE ENGINE IS BELOW FREEZING. THIS WILL LOCK THE TIPS OF THE FAN LOWER BLADES IN ICE.

- (c) Install all the plugs and covers, where available, for the intake or exhaust ducts and the different probes such as the pitot tubes. Use a brush to apply a thin layer of anti-ice fluid to the airplane surface before you install the cover. The covers will not freeze to the airplane if you do so.

EFFECTIVITY

ALL

12-33-01

03C

Page 321
Apr 22/08

S 863-017

(3) Engine Operation

- (a) Full procedures to operate the engines, in cold weather conditions, is given in AMM 71-00-00/201.

CAUTION: REMOVE ICE AND SNOW FROM THE ENGINE. IF YOU DO NOT REMOVE THE ICE AND SNOW, DAMAGE TO THE ENGINE CAN OCCUR.

- (b) Large pieces of ice and/or snow that go into the engine inlet can cause damage to the internal engine parts. Remove all the ice or snow from the engine inlet ducts and fan blades before you start the engines.
- (c) Engine icing can occur when the conditions that follow occur:
- 1) There is moisture you can see such as clouds, fog, rain, snow, sleet or ice crystals
 - 2) You will do ground operations with the static air temperature below 50°F.
- (d) You must use the thermal anti-icing system for the engine/nacelle when these conditions occur.
- (e) Before you start the engines make sure there are no fluids around the exhaust areas that can start ignition.

I. Fuel Icing

S 663-018

CAUTION: IF YOU CAN DRAIN THE FUEL FROM THE DRAIN VALVE AFTER YOU APPLIED HOT AIR TO THE EXTERIOR FOR 3 TO 5 MINUTES, DO NOT THINK THAT ALL THE ICE IS MELTED. THE ICE ADJACENT TO THE UNIT YOU ARE NOT SURE ABOUT CAN MELT AND LET SOME WATER AND FUEL FLOW FROM THE DRAIN. BUT, A PIECE OF ICE CAN STAY BEHIND. IF THE FUEL DOES NOT FLOW FROM THE DRAIN VALVE, CONTINUE TO APPLY HOT AIR FOR A SHORT TIME, AND FREQUENTLY DO A CHECK OF THE FLOW FROM THE DRAIN VALVE. CATCH THE FUEL IN A CONTAINER AND MAKE SURE ALL OF THE WATER IS REMOVED.

THE HEAT APPLIED TO THE SUMP DRAIN VALVES FOR THE MAIN AND CENTER TANKS WILL NOT REMOVE THE ICE WHICH HAS COLLECTED IN THE TANK SUMP. TO REMOVE THIS ICE, YOU MUST PUT THE AIRPLANE IN A WARM HANGAR FOR SUFFICIENT TIME TO MELT THE ICE. THEN DRAIN THE SUMPS UNTIL THE WATER IS REMOVED.

- (1) In cold weather drain the fuel tank sumps prior to refueling to remove water from the fuel tanks if the airplane has been idle for more than 45 minutes prior to refueling. Drain the fuel tank sumps again after refueling if the airplane has been idle for 2 hours or more after refueling, prior to departure (AMM 12-11-03/301).

EFFECTIVITY

ALL

12-33-01

02C

Page 322
Apr 22/08

S 663-021

- (2) The items that follow have the most effect on the quantity of water in aviation fuels:
- (a) Where the fuel is kept
 - (b) How the fuel is moved.

S 663-020

- (3) Fuel that is open to moisture or the usual atmospheric conditions contains more water than that kept in tightly sealed containers. This water in the fuel, when there is high humidity and temperature conditions that change, can be more than 3 gallons in each thousand gallons of fuel. As the temperature decreases, there is a separation of the water and the fuel. The water will collect at the lowest point in the tank and freeze if the temperature is sufficiently low. If the water has collected and frozen in the sumps (shown by no flow from the drain valves), do the step that follows:
- (a) Apply heat (hot air that is resistant to explosion) to the bottom of the wing in the area of the tank sumps.

J. Toilets and Potable Water

S 663-019

- (1) If the cabin temperature will decrease below the freezing point, service the potable water and toilets:
- (a) Potable Water

CAUTION: MAKE SURE TO DRAIN THE POTABLE WATER SYSTEM. THE POTABLE WATER SYSTEM LINES CAN FREEZE IN COLD WEATHER. IF THE SYSTEM WATER FREEZES, DAMAGE TO THE WATERLINES AND LEAKAGE AROUND THE OUTFLOW VALVE CAN OCCUR.

- 1) You must drain all of the water from the potable water system (AMM 12-14-01/301).
- (b) Toilets
 - 1) You must fully drain the vacuum waste system so it will not freeze, as applicable (AMM 12-17-01/301).

EFFECTIVITY

ALL

12-33-01

02C

Page 323
Apr 22/08

EXTREME COLD WEATHER MAINTENANCE – SERVICING

1. General

- A. This procedure has these tasks:
- (1) Short term parking at temperatures below -22°F (-30°C).
 - (2) Overnight or extended parking (airplane unattended) at temperatures below 5°F (-15°C).
 - (3) Return the airplane to service after overnight or extended parking at temperatures below 5°F (-15°C).
 - (a) During continuous operation in cold weather, it may be necessary to remove ice from the interior of the airplane (AMM 05-51-53/201).
- B. In cold weather it is necessary to drain the fuel tank sumps prior to refueling to remove water from the fuel tanks if the airplane has been idle for more than 45 minutes prior to refueling. Drain the fuel tank sumps again after refueling if the airplane has been idle for 2 hours or more after refueling, prior to departure. In cold weather water can freeze, and not let the drain valves open.
- C. Low temperatures (below freezing) can affect grease viscosity. Lubricate landing gear and flight control components in warm weather or a heated hangar. If lubrication must be accomplished in cold weather, warm air or electric heat blankets can be used to heat the components and the grease gun. For the landing gear, an enclosure can be fabricated around the strut to make the heating more efficient. Do not apply heat directly to tires.
- D. Definitions
- (1) Ice that has accumulated on the engine fan blades while the airplane has been on the ground for a prolonged stop, such as a plane that has been parked overnight, is considered Ground-Accumulated Ice.
 - (a) Ground-Accumulated Ice must be removed before take-off.
 - (2) Ice that has accumulated on the engine fan blades while the engine is idle is considered Operational Ice.
 - (a) Operational Ice is allowed before departure because it can be removed by engine run-ups during taxi-out.

TASK 12-33-02-603-001

2. Short Term Parking at Temperatures Below -22°F (-30°C)

A. General

- (1) Short term parking at temperatures below -22°F (-30°C):
 - (a) When the cabin and flight deck temperature is maintained above 32°F (0°C) and the engine oil temperature is maintained above -30°F (-34°C) while the airplane is on the ground.

EFFECTIVITY

ALL

12-33-02

03A

Page 301
Apr 22/08

CAUTION: IF YOU CAN DRAIN THE FUEL FROM THE DRAIN VALVE AFTER YOU APPLIED HOT AIR TO THE EXTERIOR FOR 3 TO 5 MINUTES, DO NOT THINK THAT ALL THE ICE IS MELTED. THE ICE ADJACENT TO THE DRAIN VALVE UNIT CAN MELT AND LET SOME WATER AND FUEL FLOW FROM THE DRAIN. BUT, A PIECE OF ICE CAN STAY BEHIND. IF THE FUEL DOES NOT FLOW FROM THE DRAIN, CONTINUE TO APPLY HOT AIR FOR A SHORT TIME, AND FREQUENTLY DO A CHECK OF THE FLOW FROM THE DRAIN. CATCH THE FUEL IN A CONTAINER AND MAKE SURE ALL OF THE WATER IS REMOVED.

THE HEAT APPLIED TO THE SUMP DRAIN VALVES FOR THE MAIN AND CENTER TANKS WILL NOT REMOVE THE ICE WHICH HAS COLLECTED IN THE TANK SUMP. TO REMOVE THIS ICE, YOU MUST PUT THE AIRPLANE IN A WARM HANGAR FOR SUFFICIENT TIME TO MELT THE ICE. THEN DRAIN THE SUMPS UNTIL THE WATER IS REMOVED.

- (2) In cold weather it is necessary to drain the fuel tank sumps prior to refueling to remove water from the fuel tanks if the airplane has been idle for more than 45 minutes prior to refueling. Drain the fuel tanks sumps again after refueling if the airplane has been idle for 2 hours or more after refueling, prior to departure (AMM 12-33-01/301 and AMM 12-11-03/301).
- (3) When adding fuel, you must use these requirements:
 - (a) Use fuels that meet specification ASTM D1655; or
 - (b) Use fuels that meet specification GOST 10227:
 - 1) RT (PT, Russian spelling)
 - 2) TS-1 (TC-1, Russian spelling)
 - (c) Approved fuel additives are:

NOTE: Adding an anti-icing fuel additive may help in the sumping of the fuel tanks.

- 1) Fuel Additive, specification GOST 8313, Fluid I (also known as Fluid E)
 - a) Fluid I may be used at a mixture of no more than 0.15 percent by volume.
- 2) Fuel Additive, specification TU-6-10-1458, Fluid I-M (also known as Fluid E- Methanol).

NOTE: This fuel additive is not approved for GE engines.

- a) Fluid I-M may be used at a mixture of no more than 0.15 percent each, by volume.
- 3) Fuel Additive, specification GOST 17477, Fluid TGF.

NOTE: This fuel additive is not approved for GE engines.

- a) Fluid TGF may be used at a mixture of no more than 0.15 percent by volume.

EFFECTIVITY

ALL

12-33-02

02A

Page 302
Dec 22/07

- 4) Fuel Additive, specification TU-6-10-1457, Fluid TGF-M (also known as Fluid TGF- Methanol).

NOTE: This fuel additive is not approved for GE engines.

- a) Fluid TGF-M may be used at a mixture of no more than 0.15 percent each, by volume.

B. References

- (1) AMM 10-11-01/201, Park the Airplane (Normal Parking)
- (2) AMM 12-13-03/301, IDG Oil Fill
- (3) AMM 12-15-01/301, Main Landing Gear Shock Strut Fluid Check
- (4) AMM 12-15-02/301, Nose Landing Gear Shock Strut Fluid Check
- (5) AMM 12-15-03/301, Landing Gear Tire Pressure Check
- (6) AMM 12-33-01/301, Cold Weather Maintenance Procedure
- (7) AMM 21-00-00/201, Supply Conditioned Air to the Airplane
- (8) AMM 24-22-00/201, Supply Electrical Power
- (9) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
- (10) AMM 32-41-06/401, Brake Disconnect Removal/Installation
- (11) AMM 32-41-08/401, Main Gear Wheel Brakes Removal/Installation
- (12) AMM 32-42-00/501, Antiskid/Autobrake System - Functional Check
- (13) AMM 71-00-00/201, Power Plant

C. Equipment

- (1) MARK I COLDBUSTER Heater - External Cabin, Trailer Mounted, Diesel Powered, Spencer Industries, Inc. (Vendor Code 12008) 8410 Dallas Ave. S , Seattle, WA 98108-4423

D. Consumable Materials

- (1) D00109 Oil - Aircraft turbine engine, synthetic base - MIL-PRF-7808.

E. Access

(1) Location Zones

- | | |
|-----|-------------------------------------|
| 100 | Lower Half of Fuselage |
| 200 | Upper Half of Fuselage |
| 300 | Empennage |
| 400 | Powerplant and Nacelle Struts |
| 500 | Left Wing |
| 600 | Right Wing |
| 700 | Landing Gear and Landing Gear Doors |
| 800 | Doors |

(2) Access Panel

194 PR Ground Air Service Connection

F. Procedure

S 553-002

- (1) Do the Cold Weather Maintenance procedure (AMM 12-33-01/301).

EFFECTIVITY

ALL

12-33-02

02A

Page 303
Aug 22/08

S 583-003

- (2) Do the Park the Airplane (Normal Parking) procedure (AMM 10-11-01/201).

S 883-004

- (3) Do one of the steps that follow to maintain the cabin temperature at or above 32°F (0°C):
- (a) Use the APU or a ground air source to run both ECS packs:
 - 1) Do the Supply Conditioned Air to the Airplane procedure (AMM 21-00-00/201).
 - (b) Use a heater, MARK I COLDBUSTER to heat the airplane through the ground air service connection panel, 194PR.

S 423-005

- (4) Install the engine inlet and exhaust covers as soon as possible after landing.

NOTE: Keep the engine covers in a warm location before you install them on the airplane. Covers that are cold or frozen may be difficult to install, and may freeze to the engine inlet and exhaust.

NOTE: At very low ambient air temperatures, the time for the engine oil to cool to -30°F (-34°C) can be greatly increased by the use of engine inlet and exhaust covers.

S 213-006

- (5) Use the engine performance maintenance page on the center display unit in the flight deck to monitor engine oil temperature.
- (a) To view the oil temperature when the engines are not running, turn on the EEC ground test power.
 - (b) If the engine oil temperature shown on the center display in the flight compartment is -30°F (-34°C), do the steps that follow:
 - 1) Remove the inlet and exhaust covers.

EFFECTIVITY

ALL

12-33-02

02A

Page 304
Dec 22/07

CAUTION: MAKE SURE THE ENGINE CORE TEMPERATURE IS ABOVE -30°F (-34°C) BEFORE YOU START THE ENGINE. IF THE ENGINE OIL TEMPERATURE IS BELOW -30°F (-34°C), DAMAGE TO THE ENGINE BEARINGS CAN OCCUR.

- 2) Heat the engine core to a minimum of -30°F (-34°C) with a heater, MARK I COLDBUSTER or suitable substitute.
 - a) If you use a multiple hose ground cart heater, MARK I COLDBUSTER, direct one heater hose in the inlet to heat the engine core, and one heater hose on the engine gearbox.
 - b) If you use a multiple hose ground cart (YMP-350 heater), direct one heater hose in the inlet to heat the engine core, and one heater hose on the engine gearbox.
 - c) If you use a single hose ground cart (Herman Nelson heater), direct the heater hose on the engine gearbox.
- 3) Make sure the engine oil temperature shown on the display in the flight compartment is above -30°F (-34°C) to prevent damage to the engine bearings when you start the engines.

NOTE: If the oil is colder than -58°F (-50°C), the indication will be blank.

- a) See cold weather starting procedures (AMM 71-00-00/201).
- b) See engine operating limits (AMM 71-00-00/201).
- (c) Start the engines (Automatic Start) (AMM 71-00-00/201).
- (d) Run the engines at idle until the oil temperature is at or above 86°F (30°C).
- (e) Make sure the engine oil temperature is at least 86°F (30°C) before you increase the power above idle.
- (f) Before shutdown of the engines, run the engines at idle for a minimum of 10 minutes.

NOTE: This will let the engine temperature stabilize.

EFFECTIVITY

ALL

12-33-02

02A

Page 305
Aug 22/07

S 863-007

- (6) Stop the Engines (Usual Engine Stop) (AMM 71-00-00/201).

S 863-008

- (7) Install the engine inlet and exhaust covers.

NOTE: Keep the engine covers in a warm location before you install them on the airplane. Covers that are cold or frozen may be difficult to install, and may freeze to the engine inlet and exhaust.

NOTE: At very low ambient temperatures, the time for the engine to cool to -30°F (-34°C) can be greatly increased by the use of engine inlet and exhaust covers.

S 203-009

- (8) Continue to use the engine oil temperature indicator in the flight deck to monitor the engine oil temperature when the engines are not running.

S 603-010

- (9) Fill the IDG with oil as required (AMM 12-13-03/301).

NOTE: If the IDG is serviced for cold weather operation, use the preferred oil, MIL-PRF-7808 instead of MIL-PRF-23699 lubricant. The only MIL-PRF-7808 lubricant approved for Sundstrand IDGs is Exxon 2389.

S 213-011

- (10) Visually check the wing lower surface for fuel leaks.

S 213-012

- (11) Visually check the landing gear.
(a) Wipe the inner cylinder with a clean cloth to check for hydraulic leakage from the seals.

EFFECTIVITY

ALL

12-33-02

02A

Page 306
Aug 22/07

S 213-013

- (12) Check the landing gear tire pressure and inflate as required (AMM 12-15-03/301).

S 213-014

- (13) Check the main landing gear shock strut fluid (AMM 12-15-01/301).

S 213-015

- (14) Check the nose landing gear shock strut fluid (AMM 12-15-02/301).

S 663-082

CAUTION: IF YOU CAN DRAIN THE FUEL FROM THE DRAIN VALVE AFTER YOU APPLIED HOT AIR TO THE EXTERIOR FOR 3 TO 5 MINUTES, DO NOT THINK THAT ALL THE ICE IS MELTED. THE ICE ADJACENT TO THE DRAIN VALVE UNIT CAN MELT AND LET SOME WATER AND FUEL FLOW FROM THE DRAIN. BUT, A PIECE OF ICE CAN STAY BEHIND. IF THE FUEL DOES NOT FLOW FROM THE DRAIN, CONTINUE TO APPLY HOT AIR FOR A SHORT TIME, AND FREQUENTLY DO A CHECK OF THE FLOW FROM THE DRAIN. CATCH THE FUEL IN A CONTAINER AND MAKE SURE ALL OF THE WATER IS REMOVED.

THE HEAT APPLIED TO THE SUMP DRAIN VALVES FOR THE MAIN AND CENTER TANKS WILL NOT REMOVE THE ICE WHICH HAS COLLECTED IN THE TANK SUMP. TO REMOVE THIS ICE, YOU MUST PUT THE AIRPLANE IN A WARM HANGAR FOR SUFFICIENT TIME TO MELT THE ICE. THEN DRAIN THE SUMPS UNTIL THE WATER IS REMOVED.

- (15) In cold weather drain the fuel tank sumps prior to refueling to remove water from the fuel tanks if the airplane has been idle for more than 45 minutes prior to refueling. Drain the fuel tank sumps again after refueling if the airplane has been idle for 2 hours or more after refueling, prior to departure (AMM 12-33-01/301 and AMM 12-11-03/301).

EFFECTIVITY

ALL

12-33-02

02A

Page 307
Aug 22/07

S 863-016

(16) Do the steps that follow just prior to flight:

CAUTION: DO NOT APPLY GROUND ELECTRICAL POWER BEFORE THE TEMPERATURE HAS REACHED -4°F (-20°C).

- (a) Provide electrical power (AMM 24-22-00/201).
- (b) Turn on the hydraulic system electric motor pumps 30 minutes before starting the engines. (AMM 29-11-00/201)

NOTE: This will make sure the hydraulic system operates normally and will prolong the life of the components.

Leave the pumps running until the engine-driven pumps are operating.

- 1) Make sure these electric pump switches are in the ON position, on the overhead Hydraulic Control Panel.
 - a) HYD PUMPS C ELEC I
 - b) HYD PUMPS C ELEC 2
 - c) HYD PUMPS L ELEC
 - d) HYD PUMPS R ELEC
- 2) If the hydraulic pressure in one system increases, then drops to zero, do the steps that follow:

NOTE: Repeat the steps a maximum of three times. After three times (cycles), you must find the cause of the pressure drop.

- a) Turn the electric motor pump OFF.
 - b) Turn the electric motor pump ON.
- 3) Leave the motor pumps running until the engine-driven pumps are operating.

S 863-017

(17) At temperatures below -22°F (-30°C), pump the brake pedals eight (8) times shortly before starting the engines. At each wheel, verify extension/retraction of brake pistons.

- (a) If brake operation is not normal, do the steps that follow:
 - 1) Provide local warming to the brake.

EFFECTIVITY

ALL

12-33-02

01A

Page 308
Apr 22/01

- 2) Do the Antiskid/Autobrake System - Functional Test (AMM 32-42-00/501).

NOTE: Do the tasks for the brakes only:
System Interface,
Antiskid Brake Release, and
Autobrake Application.

To do an operational check with the Antiskid Brake Release task, you do not need to install pressure gages at each brake. As an alternative to this, make sure that there is brake piston movement.

- 3) Repeat the test until proper operation is observed.
- 4) If the difficulty continues, replace the brake (AMM 32-41-08/401).
 - a) Do the Brake Disconnect Removal procedure (AMM 32-41-06/401).
 - b) Do the Brake Disconnect Installation (AMM 32-41-06/401).
 - c) Do the Main Gear Wheel Brakes Removal (AMM 32-41-08/401).
 - d) Do the Main Gear Wheel Brakes Installation (AMM 32-41-08/401).

S 863-018

- (18) Prepare the engines for operation (AMM 71-00-00/201).

S 863-019

- (19) Use the engine performance maintenance pages on the center display in the flight deck to monitor the engine oil temperature.
 - (a) To view the engine oil temperature when the engines are not running, turn on the EEC ground test power.
 - (b) If the engine oil temperature approaches -30°F (-34°C), do these steps:
 - 1) Remove the inlet and exhaust covers.

EFFECTIVITY

ALL

12-33-02

01A

Page 309
Apr 22/08

CAUTION: MAKE SURE THE ENGINE CORE TEMPERATURE IS ABOVE -30°F (-34°C) BEFORE YOU START THE ENGINE. IF THE ENGINE CORE TEMPERATURE IS BELOW -30°F (-34°C), DAMAGE TO THE ENGINE BEARINGS CAN OCCUR.

- 2) Heat the engine core to a minimum of -30°F (-34°C) with a heater, MARK I COLDBUSTER, or suitable substitute:
 - a) If you use a multiple hose ground cart heater, MARK I COLDBUSTER, direct one heater hose in the inlet to heat the engine core, and one heater hose on the engine gearbox.
 - b) If you use a multiple hose ground cart (YMP-350 heater), direct one heater hose in the inlet to heat the engine core, and one heater hose on the engine gearbox.
 - c) If you use a single hose ground cart (Herman Nelson heater), direct the heater hose on the engine gearbox.
- 3) Make sure the engine oil temperature is above -30°F (-34°C) to prevent damage to the engine bearings when you start the engines.

NOTE: If the oil is colder than -58°F (-50°C), the EICAS indication will be blank.

- a) See the engine operating limits (AMM 71-00-00/201).

S 213-021

- (20) Prepare the airplane for flight (AMM 12-33-01/301).

S 863-022

- (21) Start the engines (Automatic Start) (AMM 71-00-00/201)
 - (a) Run the engines at idle until the oil temperature is at or above 86°F (30°C).
 - (b) Make sure the oil temperature is at least 86°F (30°C) before you increase the power above idle.

EFFECTIVITY

ALL

12-33-02

02A

Page 310
Apr 22/07

TASK 12-33-02-603-023

3. Overnight or Extended Parking (Airplane Unattended) at Temperatures Below 5°F (-15°C)

A. General

- (1) When adding fuel, you must use these requirements:
- (a) Use fuels that meet specification ASTM D1655; or
 - (b) Use fuels that meet specification GOST 10277:
 - 1) RT (PT, Russian spelling)
 - 2) TS-1 (TC-1, Russian spelling)
 - (c) Approved fuel additives are:

NOTE: Adding an anti-icing fuel additive may help in the sumping of the fuel tanks.

- 1) Fuel Additive, specification GOST 8313, Fluid I (also known as Fluid E)
 - a) Fluid I may be used at a mixture of no more than 0.15 percent by volume.
- 2) Fuel Additive, specification TU-6-10-1458, Fluid I-M (also known as Fluid E- Methanol).

NOTE: This fuel additive is not approved for GE engines.

- a) Fluid I-M may be used at a mixture of no more than 0.15 percent each, by volume.
- 3) Fuel Additive, specification GOST 17477, Fluid TGF.

NOTE: This fuel additive is not approved for GE engines.

- a) Fluid TGF may be used at a mixture of no more than 0.15 percent by volume.
- 4) Fuel Additive, specification TU-6-10-1457, Fluid TGF-M (also known as Fluid TGF- Methanol).

NOTE: This fuel additive is not approved for GE engines.

- a) Fluid TGF-M may be used at a mixture of no more than 0.15 percent each, by volume.

EFFECTIVITY

ALL

12-33-02

02A

Page 311
Apr 22/07

B. References

- (1) AMM 09-11-00/201, Tow the Airplane
- (2) AMM 10-11-01/201, Park the Airplane (Normal Parking)
- (3) AMM 10-11-02/201, Prepare the Airplane for Storage for More Than 7 Days
- (4) AMM 12-13-03/301, IDG Oil Fill
- (5) AMM 12-14-01/301, Potable Water System Drain
- (6) AMM 12-17-01/301, Waste Tank Servicing
- (7) AMM 12-33-01/301, Cold Weather Maintenance Procedure
- (8) AMM 24-22-00/201, Supply Primary External Power
- (9) AMM 24-30-00/501, Main Battery and APU Battery Charge Capacity - System Test
- (10) AMM 24-31-01/401, Main Battery Removal/Installation
- (11) AMM 24-31-04/401, APU Battery Removal/Installation
- (12) AMM 25-63-02/201, Megaphone Battery Replacement
- (13) AMM 33-51-07/201, Power Supply - Battery Pack Replacement, Power Supply - Power Supply Replacement

C. Consumable Materials

- (1) D00109 Oil - Aircraft turbine engine, synthetic base - MIL-PRF-7808

D. Access

- (1) Location Zones
 - 100 Lower Half of Fuselage
 - 200 Upper Half of Fuselage
 - 300 Empennage
 - 400 Powerplant and Nacelle Struts
 - 500 Left Wing
 - 600 Right Wing
 - 700 Landing Gear and Landing Gear Doors
 - 800 Doors

E. Procedure

S 423-024

- (1) Install the inlet and exhaust covers.

NOTE: Keep the engine covers in a warm location before you install them on the airplane. Covers that are cold or frozen may be difficult to install, and may freeze to the engine inlet and exhaust.

At very low ambient air temperatures, the time for the engine to cool to -30°F (-34°C) can be greatly increased by the use of engine inlet and exhaust covers.

EFFECTIVITY

ALL

12-33-02

03A

Page 312
Apr 22/08

S 553-025

- (2) Do the Cold Weather Maintenance procedure (AMM 12-33-01/301).

S 503-026

- (3) Do the Park the Airplane (Normal Parking) procedure (AMM 10-11-01/201).

S 503-027

- (4) If the airplane will be parked for longer than 7 days, prepare the airplane for storage for more than seven days (AMM 10-11-02/201).

NOTE: Prepare to park the airplane for extended periods.

S 603-028

- (5) Fill the IDG with oil as required (AMM 12-13-03/301).

NOTE: If the IDG is serviced for cold weather operation, use the preferred oil, MIL-PRF-7808 instead of MIL-PRF-23699 lubricant. The only MIL-PRF-7808 lubricant approved for Sundstrand IDGs is Exxon 2389.

S 213-029

- (6) Visually check the wing lower surface for fuel leaks.

S 213-030

- (7) Visually check the landing gear.
(a) Wipe the inner cylinder with a clean cloth to check for hydraulic leakage from the seals.

S 683-085

CAUTION: MAKE SURE TO DRAIN THE POTABLE WATER SYSTEM. THE POTABLE WATER SYSTEM LINES CAN FREEZE IN COLD WEATHER. IF THE SYSTEM WATER FREEZES, DAMAGE TO THE WATERLINES AND LEAKAGE AROUND THE OUTFLOW VALVE CAN OCCUR.

- (8) Drain the potable water system (AMM 12-14-01/301).

NOTE: The potable water system must be fully drained.

EFFECTIVITY

ALL

12-33-02

02A

Page 313
Dec 22/07

S 683-033

- (9) Make sure all galley inserts, coffee pots, water heaters, filters, and boilers are empty and supply lines are drained using the manufacturer's instructions.

S 683-034

WARNING: THE GLYCOL (ANTIFREEZE) MUST NOT CONTAIN ANY FORM OF "STOP LEAK" CHEMICAL AS THIS CAN CAUSE DAMAGE TO THE SYSTEM COMPONENTS.

- (10) If you do not drain the waste system, add glycol.

NOTE: Use the fluid manufacturer's recommendations for mixture ratios (AMM 12-17-01/301).

- (a) If the glycol-water mixture does not provide adequate protection, do the step that follows:

1) Fully drain the waste system (AMM 12-17-01/301).

S 623-035

- (11) Do the preservation for the electrical/electronic systems.

NOTE: Do not remove the batteries from the emergency radio beacons in the slide/raft covers and life rafts.

- (a) Remove the megaphone battery, do this task: Megaphone Battery Replacement (AMM 25-63-02/201).

- (b) Remove the emergency light batteries, do this task: Power Supply - Battery Pack Replacement (AMM 33-51-07/201).

- (c) Remove the batteries from the power supply module for the emergency lights, do this task: Power Supply - Battery Pack Replacement (AMM 33-51-07/201).

- (d) Apply electrical power to all of the electrical/electronic equipment remaining in the airplane for a minimum of 2 hours (AMM 24-22-00/201).

1) Look at the EICAS to make sure the main battery (AMM 24-31-01/401) and the APU battery (AMM 24-31-04/401) are fully charged.

EFFECTIVITY

ALL

12-33-02

02A

Page 314
Dec 22/07

(e) Disconnect the APU battery (AMM 24-31-04/401).

NOTE: You can connect the battery for APU operations.

(f) Disconnect the main battery (AMM 24-31-01/401).

(g) Put all batteries in a warm location where the temperature remains above 50°F (10°C).

S 023-081

(12) If you need to tow the airplane, install the main battery and APU battery (AMM 24-31-01/401 and AMM 24-31-04/401).

WARNING: BOEING DOES NOT RECOMMEND TOWING THE AIRPLANE WHEN ELECTRICAL POWER IS NOT AVAILABLE TO OPERATE THE BRAKE HYDRAULIC SYSTEM. IF TOWING WITHOUT POWER IS REQUIRED, TELL THE TOW VEHICLE DRIVER. TOW SPEEDS MUST BE DECREASED TO WALKING SPEED (OR A SPEED WHICH WILL ALLOW THE TOW VEHICLE TO STOP THE AIRPLANE IN A SHORT DISTANCE) OR YOU MUST NOT TOW THE AIRPLANE. WITHOUT ELECTRICAL POWER, THERE IS ONLY ACCUMULATOR PRESSURE AVAILABLE TO OPERATE THE BRAKES THREE (3) TIMES. IF YOU DO NOT OBEY THIS WARNING, IT CAN CAUSE INJURY TO PERSONS OR DAMAGE TO THE AIRPLANE.

(a) Tow the airplane (AMM 09-11-00/201).

NOTE: With a minimum of 2800 psi, you can apply the brakes no more than three (3) times before the accumulator is depleted below the precharge (red band) level where no brakes will be available.

S 553-038

(13) Prepare the airplane for storage:

(a) Close the outflow valve.

(b) Open the battery bus circuit breaker.

(c) Remove the main batteries and APU batteries and put them in a warm location where the temperature remains above 50°F (10°C) (AMM 24-31-01/401 and AMM 24-31-04/401).

EFFECTIVITY

ALL

12-33-02

02A

Page 315
Apr 22/07

- (d) Close all the main cabin doors, galley service doors, cargo compartment doors, access doors, and flight compartment windows.

NOTE: This will prevent snow from getting into the airplane interior.

TASK 12-33-02-603-039

4. Return the Airplane to Service After overnight or Extended Parking at Temperatures Below 5°F (-15°C)

A. General

- (1) If the temperature has remained above -40°F (-40°C), passenger cabin warming is not necessary.
(a) For temperatures below -4°F (-20°C), make sure the flight deck is warmed and maintained at -4°F (-20°C) for 30 minutes.
- (2) If the temperature has been below -40°F (-40°C) within the last 12 hours, then you must warm the airplane.

B. References

- (1) AMM 10-11-01/201, Normal Parking
(2) AMM 10-11-02/201, Prolonged Parking
(3) AMM 12-11-03/301, Fuel Sump Draining
(4) AMM 12-13-03/301, IDG Oil Fill
(5) AMM 12-15-01/301, Main Gear Shock Strut
(6) AMM 12-15-02/301, Nose Gear Shock Strut
(7) AMM 12-15-03/301, Landing Gear Tire Servicing
(8) AMM 12-15-08/301, Oxygen
(9) AMM 12-33-01/301, Cold Weather Maintenance
(10) AMM 20-41-00/201, Static Grounding
(11) AMM 22-10-00/501, Autopilot (Flight Controls)
(12) AMM 24-22-00/201, Supply Electrical Power
(13) AMM 24-30-00/501, Main and APU Battery Charge - System Check
(14) AMM 24-31-01/401, Main Battery
(15) AMM 24-31-04/401, APU Battery
(16) AMM 25-63-02/201, Megaphone Operational Test
(17) AMM 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
(18) AMM 32-35-00/501, Landing Gear Alternate Extension
(19) AMM 32-35-10/401, System Power Pack Alternate Extension
(20) AMM 32-41-00/201, Hydraulic Brake System
(21) AMM 32-42-03/401, Antiskid Module Components
(22) AMM 32-41-08/401, Main Landing Gear Brake Removal/Installation
(23) AMM 33-51-00/501, Emergency Lights - Functional Test
(24) AMM 33-51-07/201, Power Supply - Battery Pack
(25) AMM 49-11-00/201, APU Starting and Operation
(26) AMM 71-00-00/201, Power Plant

EFFECTIVITY

ALL

12-33-02

01A

Page 316
Apr 22/08

C. Equipment

- (1) MARK I COLDBUSTER Heater - External Cabin, Trailer Mounted, Diesel Powered, Spencer Industries, Inc. (Vendor Code 12008)
8410 Dallas Ave. S., Seattle WA 98108-4423

D. Consumable Materials

- (1) D00109 Oil, Aircraft turbine engine, synthetic base - MIL-PRF-7808

E. Access

(1) Location Zones

- 100 Lower Half of Fuselage
- 200 Upper Half of Fuselage
- 300 Empennage
- 400 Power Plant and Nacelle Struts
- 500 Left Wing
- 600 Right Wing
- 700 Landing Gear and Landing Gear Doors
- 800 Doors

(2) Access Panels

- (a) 113AL Forward Equipment Bay Access Panel
- (b) 119AL Main Equipment Center Access Panel
- (c) 193GL Conditioned Air Ground Service Panel.

F. Procedure

S 663-083

CAUTION: IF YOU CAN DRAIN THE FUEL FROM THE DRAIN VALVE AFTER YOU APPLIED HOT AIR TO THE EXTERIOR FOR 3 TO 5 MINUTES, DO NOT THINK THAT ALL THE ICE IS MELTED. THE ICE ADJACENT TO THE DRAIN VALVE UNIT CAN MELT AND LET SOME WATER AND FUEL TO FLOW FROM THE DRAIN. BUT, A PIECE OF ICE CAN STAY BEHIND. IF THE FUEL DOES NOT FLOW FROM THE DRAIN, CONTINUE TO APPLY HOT AIR FOR A SHORT TIME, AND FREQUENTLY DO A CHECK OF THE FLOW FROM THE DRAIN. CATCH THE FUEL IN A CONTAINER AND MAKE SURE ALL OF THE WATER IS REMOVED.

THE HEAT APPLIED TO THE SUMP DRAIN VALVES FOR THE MAIN AND CENTER TANKS WILL NOT REMOVE THE ICE WHICH HAS COLLECTED IN THE TANK SUMP. TO REMOVE THIS ICE, YOU MUST PUT THE AIRPLANE IN A WARM HANGAR FOR SUFFICIENT TIME TO MELT THE ICE. THEN DRAIN THE SUMPS UNTIL THE WATER IS REMOVED.

- (1) In cold weather drain the fuel tank sumps prior to refueling to remove water from the fuel tanks if the airplane has been idle for more than 45 minutes prior to refueling. Drain the fuel tank sumps again after refueling if the airplane has been idle for 2 hours or more after refueling, prior to departure (AMM 12-33-01/301 and AMM 12-11-03/301).

EFFECTIVITY

ALL

12-33-02

01A

Page 317
Aug 22/04

S 553-040

- (2) Do the Cold Weather Maintenance procedure (AMM 12-33-01/301).

S 553-041

- (3) Put the airplane back to a serviceable condition after storage (AMM 10-11-02/201).

S 883-074

- (4) If the ambient temperature is -40°F (-40°C) or below within the last 12 hours, do the steps that follow:

(a) Secure the lavatory doors in the open position.

CAUTION: THE AIR ENTERING THE CONDITIONED AIR GROUND SERVICE PORT MUST NOT EXCEED 158°F (70°C) AND THE PRESSURE MUST NOT EXCEED 15 INCHES (38 CENTIMETERS) OF WATER AT THE POINT WHERE THE AIR ENTERS THE BODY OF THE AIRPLANE.

(b) For ground equipment with multiple heating hoses (YMP-350), do the steps that follow:

NOTE: It will take approximately 60 minutes to raise the flight deck temperature from -54°F (-65°C) to -4°F (-20°C) with the YMP-350 heating unit.

- 1) Put the outflow valve to the OPEN position.
- 2) Connect one heating hose to the 193GL conditioned air ground service panel.
- 3) Insert two heating hoses in the main equipment center through the access panel 119AL.
- 4) Insert one heating hose into the forward equipment bay through the access panel 113AL.
- 5) Make sure you maintain the flight deck temperature at or above -4°F (-20°C) for 30 minutes.

CAUTION: THE AIR ENTERING THE CONDITIONED AIR GROUND SERVICE PORT MUST NOT EXCEED 158°F (70°C) AND THE PRESSURE MUST NOT EXCEED 15 INCHES (38 CENTIMETERS) OF WATER AT THE POINT WHERE THE AIR ENTERS THE BODY OF THE AIRPLANE.

(c) For ground equipment with a single heating hose (Herman Nelson heater), do the steps that follow:

- 1) Connect the heating hose to the 193GL conditioned air ground service panel.

EFFECTIVITY

ALL

12-33-02

01A

Page 318
Aug 22/04

- 2) Attach the return hose to the 119AL main equipment center bay door.
 - 3) Make sure you maintain the flight deck temperature at or above -4°F (-20°C) for 30 minutes.
- (d) Warm the engines (AMM 71-00-00/201).

NOTE: It is not necessary to complete the engine warming before proceeding to the following steps.

S 633-080

- (5) Activate the electrical/electronic systems.

NOTE: Before electrical power is applied, visually make sure all control lever positions agree with the movable control surfaces.

- (a) Make sure there is an electrical ground on the airplane (AMM 20-41-00/201).
 - 1) Do the Park the Airplane (Normal Parking) procedure (AMM 10-11-02/201).
- (b) Make sure all switches that are not necessary are in the OFF position.

NOTE: This does not include the switches to activate the systems.

- (c) Install or connect the main batteries if it is applicable (AMM 24-31-04/401).
- (d) Connect the APU battery (AMM 24-31-04/401).
- (e) Install the emergency light batteries (AMM 33-51-07/201).
 - 1) If the emergency light batteries stayed on the airplane during storage, do the step that follows:

NOTE: If you disconnected the wires to the battery packs from the electrical power source, connect the wires.

- a) Make sure the circuit breakers for charging the emergency light batteries are closed.

EFFECTIVITY

ALL

12-33-02

01A

Page 319
Apr 22/08

 **BOEING**
767
MAINTENANCE MANUAL

- b) If you removed the battery cartridges from the airplane, install the cartridges.
- (f) Install the megaphone batteries (AMM 25-63-02/201).
- (g) Install all of the other batteries:
 - 1) Make a check of the batteries in the emergency radio beacons.

NOTE: These batteries are located in the slide/raft covers and the life raft. These batteries are only activated when they are touched by water.

- 2) Install the flashlight batteries and other equivalent non-rechargeable batteries.

NOTE: These batteries could have been moved to other areas, or other airplanes. If they were, install new batteries when the airplane is put back in service.

- (h) Close all of the applicable circuit breakers for the electronic/electrical components.
- (i) Close the circuit breaker for the parking brake valve.

NOTE: If the circuit breakers for the Antiskid/Autobrake Control Unit were opened to prevent EICAS and BITE message errors, close these circuit breakers.

- (j) Close all of the applicable circuit breakers on the overhead circuit breaker panels.
- (k) Close the circuit breakers on the main power distribution panels.

CAUTION: DO NOT APPLY GROUND ELECTRICAL POWER BEFORE THE TEMPERATURE HAS REACHED -4°F (-20°C).

- (l) Apply electrical power to all the electrical/electronic equipment for a minimum of 2 hours (AMM 24-22-00/201).
 - 1) Make sure the main battery is in the fully charged condition.

EFFECTIVITY

ALL

12-33-02

01A

Page 320
Apr 22/04

- 2) Make sure the APU battery is in the fully charged condition.

CAUTION: DO NOT TURN ON THE EMERGENCY LIGHT SYSTEM IF POWER HAS NOT BEEN APPLIED TO THE INSTALLED SYSTEM WHILE THE AIRPLANE WAS PARKED FOR 6 DAYS OR MORE. DO NOT TURN ON THE SYSTEM FOR A MINIMUM OF 90 MINUTES AFTER YOU APPLY ELECTRICAL POWER. DO NOT DO A FUNCTIONAL TEST UNTIL THE BATTERIES HAVE BEEN CHARGED FOR A MINIMUM OF 90 MINUTES. THIS IS NECESSARY BECAUSE THE SYSTEM MUST BE CHARGED BEFORE IT IS ABLE TO OPERATE CORRECTLY.

- 3) Make sure the Emergency Light System battery packs are in the fully charged condition.

NOTE: The battery packs in the emergency light power supplies are continuously charged when electrical power is supplied to the airplane, unless the emergency light switches are set to the ON mode. If the battery packs are fully drained, maximum time necessary to charge them is 90 minutes.

CAUTION: DO NOT TURN ON THE EMERGENCY LIGHT SYSTEM IF POWER HAS NOT APPLIED TO THE INSTALLED SYSTEM WHILE THE AIRPLANE WAS PARKED FOR 6 DAYS OR MORE. DO NOT TURN ON THE SYSTEM FOR A MINIMUM OF 90 MINUTES AFTER YOU APPLY ELECTRICAL POWER. DO NOT DO A FUNCTIONAL TEST UNTIL THE BATTERIES HAVE BEEN CHARGED FOR A MINIMUM OF 90 MINUTES. THIS IS NECESSARY BECAUSE THE SYSTEM MUST BE CHARGED BEFORE IT IS ABLE TO OPERATE CORRECTLY.

- 4) Do the system test of the Emergency Light System (AMM 33-51-00/501).

NOTE: The battery packs in the emergency light power supplies are continuously charged when electrical power is supplied to the airplane, unless the emergency light switches are set to the ON mode. If the battery packs are fully drained, maximum time necessary to charge them is 90 minutes.

EFFECTIVITY

ALL

12-33-02

01A

Page 321
Aug 22/05

- (m) Make sure the applicable switches are returned to the correct position after the power is turned on.

S 863-076

- (6) Make sure the flight deck has been warmed and maintained at or above -4°F (-20°C) for 30 minutes, then do the steps that follow:
 - (a) Disconnect the ground cart.
 - (b) Close all panels as applicable.
 - 1) Remove the heating hose to the air conditioned air ground service panel, 193GL.
 - 2) Remove the heating hoses in the Main Equipment Center Access Panel, 119AL.
 - 3) Make sure the main equipment center bay door 119AL is closed.
 - 4) Remove the heating hose in the Forward Equipment Bay Access Panel, 113AL.
 - 5) Make sure the forward equipment bay door 113AL is closed.
 - (c) Make sure the outflow valves are in the OPEN position.
 - (d) Close the battery bus circuit breakers.
 - (e) Start the APU with the battery or ground power (AMM 49-11-00/201) .

NOTE: To improve starting capability of the APU at temperatures below -40°F (-40°C), it may be desirable to use low viscosity oil (MIL-PRF-7808).

The EICAS may indicate low APU oil quantity for the first 5 minutes after the APU start or until the APU has warmed up.

- (f) Make sure the recirculation fan switches are in the ON position.
- (g) Close the pack and zone circuit breakers if they are open.
- (h) Put all zone selectors in the 12 o'clock position.
- (i) Make sure the Trim Air switches are ON.

EFFECTIVITY

ALL

12-33-02

01A

Page 322
Apr 22/04

- (j) Turn the left and right pack switches to AUTO (AMM 21-00-00/201).

S 863-071

CAUTION: DO NOT CYCLE THE CONTROL COLUMN, WHEEL, RUDDER PEDALS, BRAKE PEDALS, GROUND SPOILERS, STABILIZER OR FLAPS UNTIL THE PUMPS HAVE RUN FOR AT LEAST 15 MINUTES.

- (7) Turn on the hydraulic system electric motor pumps 30 minutes before starting the engines.

NOTE: This will make sure the hydraulic system operates normally and will prolong the life of the components.

- (a) Use alternating current motor pump to pressurize the main hydraulic system (AMM 29-11-00/201).
- (b) Select these electric and air driven pump switches to the ON position, on the overhead Hydraulic Control Panel.
 - 1) HYD PUMPS C ELEC 1
 - 2) HYD PUMPS C ELEC 2
 - 3) HYD PUMPS L ELEC
 - 4) HYD PUMPS R ELEC
 - 5) HYD PUMP C AIR DEM
- (c) Leave the motor pumps running until the engine-driven pumps are operating.
- (d) If the hydraulic pressure in one system increases, then drops to zero, do the steps that follow:

NOTE: Repeat the steps a maximum of three times. After three times (cycles), you must find the cause of the pressure drop.

- 1) Turn the electric motor pump OFF.
- 2) Turn the electric motor pump ON.

EFFECTIVITY

ALL

12-33-02

01A

Page 323
Apr 22/00

S 863-042

- (8) Do the functions of the flight control systems that follow:
- (a) Slowly (1 to 2 seconds), move the control column, wheel, rudder pedals, and the ground spoilers.

NOTE: You must complete at least 10 cycles of each control to near full travel.

- 1) Verify that the movement of the flight control systems are normal on EICAS.
- (b) Run the stabilizer trim full travel nose up and nose down using the column trim switch.
- (c) Select the flaps to the full down position.

NOTE: Wait for the flaps to reach the full down position.

- (d) Select the flaps to the full up position.

NOTE: Wait for the flaps to reach the full up position.

- (e) Prepare for the autopilot check (AMM 22-10-00/501).
 - 1) Set the autopilot stab trim cutout switch, on the control stand, to the CUTOUT position.

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM THE FLIGHT CONTROL SURFACES. THE AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, STABILIZER AND NOSE GEAR CAN MOVE SUDDENLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- 2) Make sure hydraulic power is applied to systems A and B. To supply hydraulic power (AMM 29-11-00/201).

NOTE: Hydraulic power is necessary for surface test.

- (f) Operate the autopilot servos as follows:
 - 1) Engage one autopilot channel.

EFFECTIVITY

ALL

12-33-02

01A

Page 324
Aug 22/05

- 2) Engage vertical speed mode.
 - a) Select vertical speed of 2000 fpm.

NOTE: Wait for the column motion to stop.
 - b) Select vertical speed of -2000 fpm.

NOTE: Wait for the column motion to stop.
- 3) Engage heading select mode.
 - a) Select 30 degree heading change to the left of the airplane heading.

NOTE: Wait for wheel motion to stop.
 - b) Select 30 degree heading change to the right of the airplane heading.

NOTE: Wait for wheel motion to stop.
- 4) Repeat steps 1 thru 3 for the other two autopilot channels.

S 863-043

- (9) At temperatures below -22°F (-30°C) pump the brake pedal (8) times shortly before starting the engines. At each wheel, verify extension/retraction of brake pistons.
 - (a) If brake operation is not normal, do the steps that follow (AMM 32-41-00/201 and AMM 32-42-03/401):
 - 1) Provide local warming to the brake.
 - 2) Repeat the test until proper operation is observed.
 - 3) If the difficulty persists, replace the brake (AMM 32-41-08/401).

S 203-044

- (10) Inspect the wheel wells for ice/snow/slush on the Alternate Landing Gear System Components. Clear as necessary.

S 603-077

- (11) Fill the IDG with oil as required (AMM 12-13-03/301).

NOTE: If the IDG is serviced for cold weather operation, use the preferred oil, MIL-PRF-7808 lubricant instead of MIL-PRF-23699 lubricant. The only MIL-PRF-7808 lubricant approved for Sundstrand IDGs is Exxon 2389.

EFFECTIVITY

ALL

12-33-02

01A

Page 325
Apr 22/04

S 213-045

- (12) Visually check the wing lower surface for fuel leaks.

S 213-046

- (13) Visually check the landing gear.
(a) Wipe the inner cylinder with a clean cloth to check for hydraulic leakage from the seals.

S 213-047

- (14) Check the tire pressure and inflate the tires as required (AMM 12-15-03/301).

S 213-048

- (15) Check the main gear shock strut and service as required (AMM 12-15-01/301).

S 213-049

- (16) Check the nose gear shock strut, and service as required (AMM 12-15-02/301).

S 863-050

- (17) When adding fuel, you must use these requirements:
(a) Use fuels that meet specification ASTM D1655, or use fuels that meet specification GOST 10227:
1) RT (PT, Russian spelling)
2) TS-1 (TC-1, Russian spelling)
(b) Approved fuel additives are:

NOTE: Adding an anti-icing fuel additive may help in the sumping of the fuel tanks.

- 1) Fuel Additive, specification GOST 8313, Fluid I (also known as Fluid E)
a) Fluid I may be used at a mixture of no more than 0.15 percent by volume.

EFFECTIVITY

ALL

12-33-02

02A

Page 326
Apr 22/07

- 2) Fuel Additive, specification TU-6-10-1458, Fluid I-M (also known as Fluid E- Methanol).

NOTE: This fuel additive is not approved for GE engines.

- a) Fluid I-M may be used at a mixture of no more than 0.15 percent each, by volume.
- 3) Fuel Additive, specification GOST 17477, Fluid TGF.

NOTE: This fuel additive is not approved for GE engines.

- a) Fluid TGF may be used at a mixture of no more than 0.15 percent by volume.
- 4) Fuel Additive, specification TU-6-10-1457, Fluid TGF-M (also known as Fluid TGF- Methanol).

NOTE: This fuel additive is not approved for GE engines.

- a) Fluid TGF-M may be used at a mixture of no more than 0.15 percent each, by volume.

S 603-051

- (18) Prepare the engines for operation (AMM 71-00-00/201).

S 213-052

- (19) Use the EICAS to monitor the engine oil temperature when the engines are not running.
 - (a) If the engine oil temperature shown on the EICAS approaches -30°F (-34°C), do the steps that follow:
 - 1) Remove the engine inlet and exhaust covers.

CAUTION: MAKE SURE THE ENGINE CORE TEMPERATURE IS ABOVE -30°F (-34°C) BEFORE YOU START THE ENGINE. IF THE ENGINE CORE TEMPERATURE IS BELOW -30°F (-34°C), DAMAGE TO THE ENGINE BEARINGS CAN OCCUR.

- 2) Heat the engine core to a minimum of -30°F (-34°C) with a heater, MARK I COLDBUSTER or suitable substitute:
 - a) If you use a multiple hose ground cart heater, MARK I COLDBUSTER, direct one heater hose in the inlet to heat the engine core, and one heater hose on the engine gearbox.

EFFECTIVITY

ALL

12-33-02

02A

Page 327
Dec 22/07

 **BOEING**
767
MAINTENANCE MANUAL

- b) If you use a multiple hose ground cart (YMP-350 heater), direct one heater hose in the inlet to heat the engine core, and one heater hose on the engine gearbox.
 - c) If you use a single hose ground cart (Herman Nelson heater), direct the heater hose on the engine gearbox.
- 3) Make sure the engine oil temperature on the EICAS is above -30°F (-34°C) to prevent damage to the engine bearings before you start the engines.
- a) See cold weather starting procedures and engine operating limits (AMM 71-00-00/201).

S 863-053

- (20) Start the engines (Automatic Start) (AMM 71-00-00/201).
- (a) Run the engines at idle until the oil temperature is at or above 86°F (30°C).
 - (b) Make sure the oil temperature is at least 86°F (30°C) before you increase the power above idle.

S 803-054

- (21) Observe the flight crew and portable oxygen systems.
- (a) It may be noted that the pressure in the flight crew and portable oxygen systems may indicate lower than normal at cold temperatures (AMM 12-15-08/301).

EFFECTIVITY

ALL

12-33-02

02A

Page 328
Aug 22/07